IMPORTANT

Before you remove the Wire-Seal, check the contents of this envelope with the listing on the front of the envelope. If any part is missing, your Howard W. Sams distributor will replace the entire PHOTOFACT set IF the Wire-Seal has not been damaged.

This PHOTOFACT Folder Set is

WIRE-SEALED FOR YOUR PROTECTION

to guarantee completeness of contents

DO NOT ACCEPT IF SEAL HAS BEEN BROKEN

TO OPEN ***JUST DO THIS:***

1

Take hold of the Set with both hands. Place your thumbs directly under the top wire-seal; then, divide the contents equally by putting your thumbs midway through the thickness of the Set. Now, pull the two sections apart at the top, firmly.

2

Repeat this process, pulling close to the wire-seal at the bottom, so that the set is now divided into two equal parts.

3

Continue this "pulling-apart" process with the section in which the wire-seals remain, dividing it in half.

4

Finally, remove the wire-seals left in the last section; this can easily be done with your fingernail or any sharp instrument.

Your "Safety-Sealed" PHOTOFACT Set is now ready for profit-making use . . .

IMPORTANT

Before you remove the Wire-Seal, check the contents of this envelope with the listing on the front of the envelope. If any part is missing, your Howard W. Sams distributor will replace the entire PHOTOFACT set IF the Wire-Seal has not been damaged.

The PHOTOFACT® Servicer

SET 512 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ DEC. 1960

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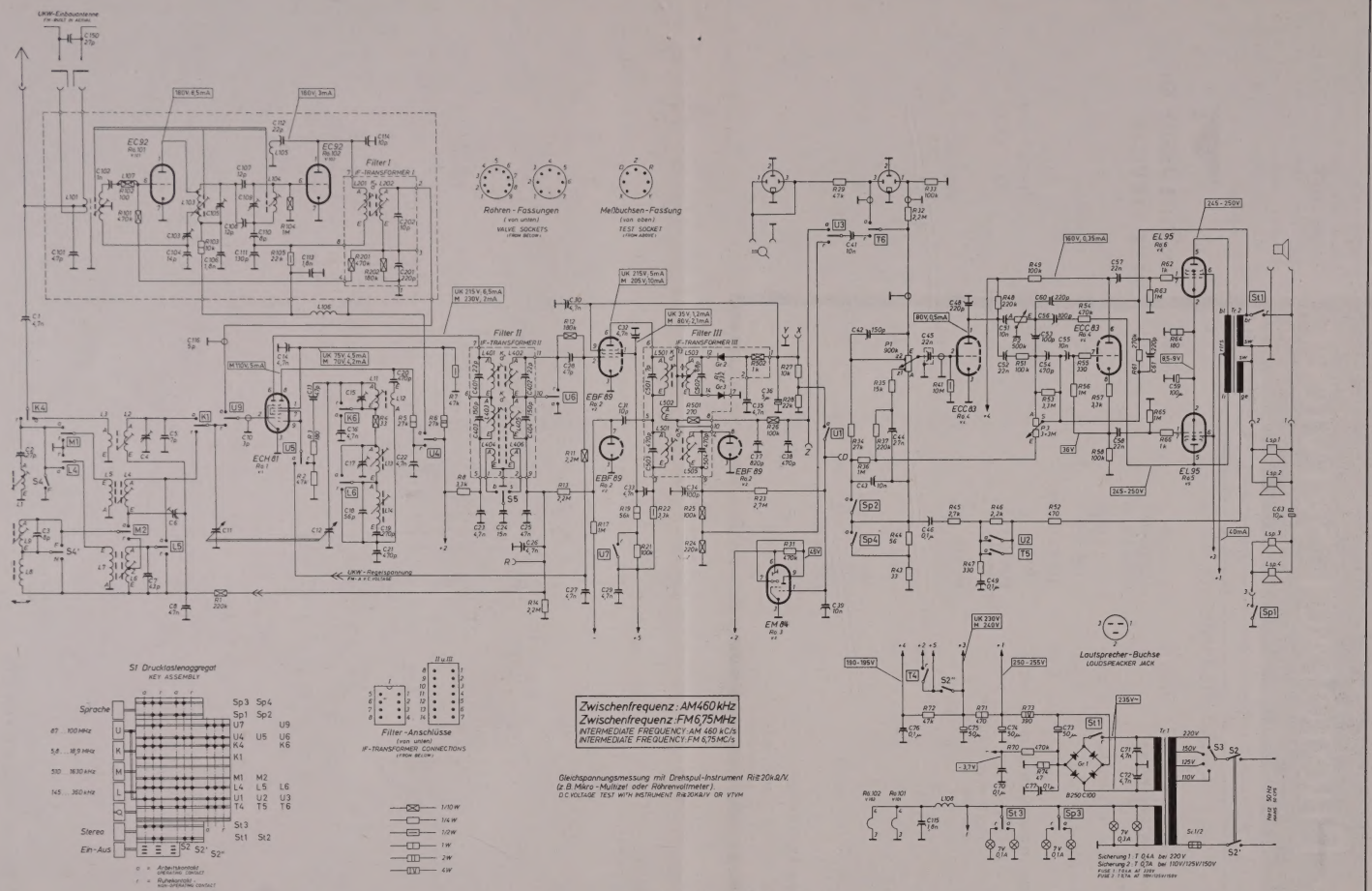
This Servicer provides you with essential data on other models or special equipment not covered in standard PHOTOFACT folders. The schematics and supplementary data included here will be of valuable help to you in servicing this equipment.

IN THIS ISSUE OF THE SERVICER:

Precise Model
Mark XXV

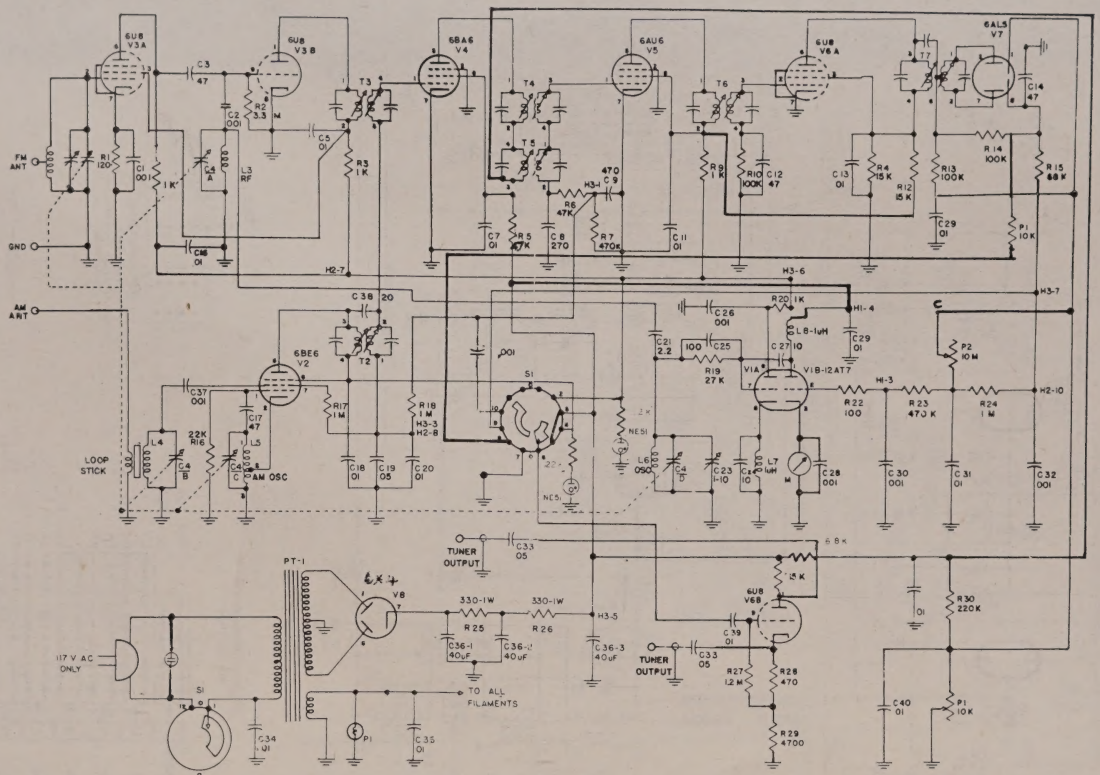
Saba Model
200-10-T



SABA MODEL 200-10-T

Schematic Diagram Courtesy of Saba: Importer A. E. Dufenhorst Co.

This Model Similar To The One Covered In Photofact Folder 18 In Set 470



PRECISE MODEL MARK XXV

Schematic Diagram Courtesy of Precise Development Corp.

PHOTOFACT® Folder

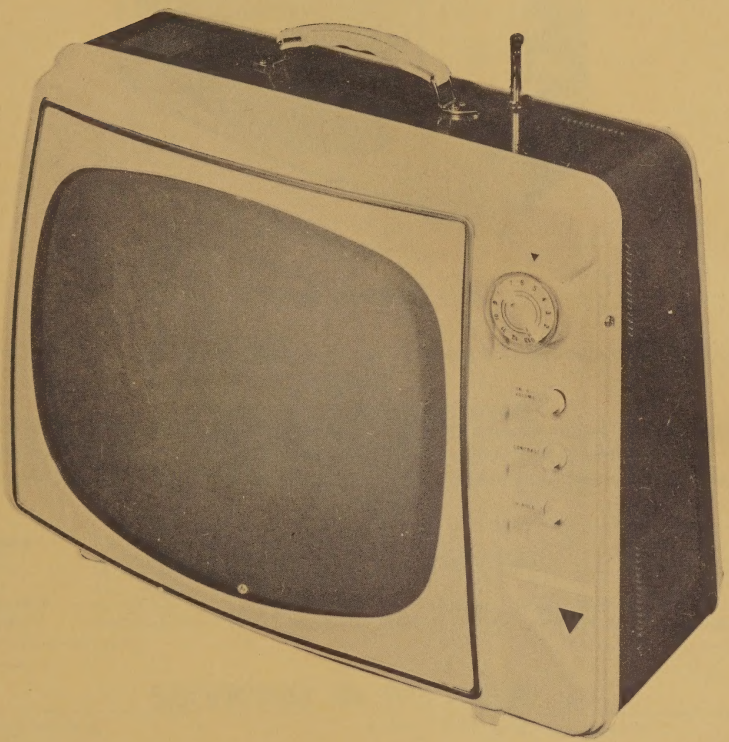
AIRLINE MODELS
GTC-4220A, GTC-4320A

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

AIRLINE MODELS
GTC-4220A, GTC-4320A



MODEL GTC-4220A

AIRLINE MODELS
GTC-4220A, GTC-4320A

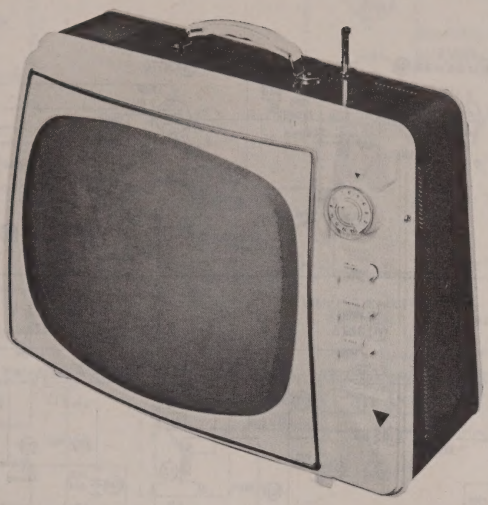
HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

SET 512 FOLDER 1

AIRLINE MODELS GTC-4220A, GTC-4320A

AIRLINE MODELS GTC-4220A, GTC-4320A



MODEL GTC-4220A

CAUTION

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

Care should be exercised when connecting test equipment or physically contacting chassis. Isolation devices employed by manufacturer should be checked and properly connected before returning receiver to owner.

TRADE NAME	Airline Models GTC-4220A, GTC-4320A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Avenue, Chicago, Illinois
TYPE SET	Portable Television Receiver
TUBES	VHF - Sixteen, UHF - Seventeen
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 140 Watts, 1.45 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

Remove 5 push-on type knobs from the front. Remove 5 screws holding trim. Tilt glass out and remove.

FUSE DEVICE

A 5.5Ω fusible resistor is used for low voltage power supply protection. (For location, see R93 in photo "Upper Chassis- Top View".)

TUNER OSCILLATOR ADJUSTMENTS

To touch-up VHF Oscillator, remove plug in side of cabinet.

AGC

The AGC may be varied by means of an AGC control. (For location, see "Tube Placement Chart".)

FOCUS

No provision is made to vary the focus on this receiver.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The Horizontal Frequency slug is used for the Horizontal Hold. (For location, see "Tube Placement Chart".)

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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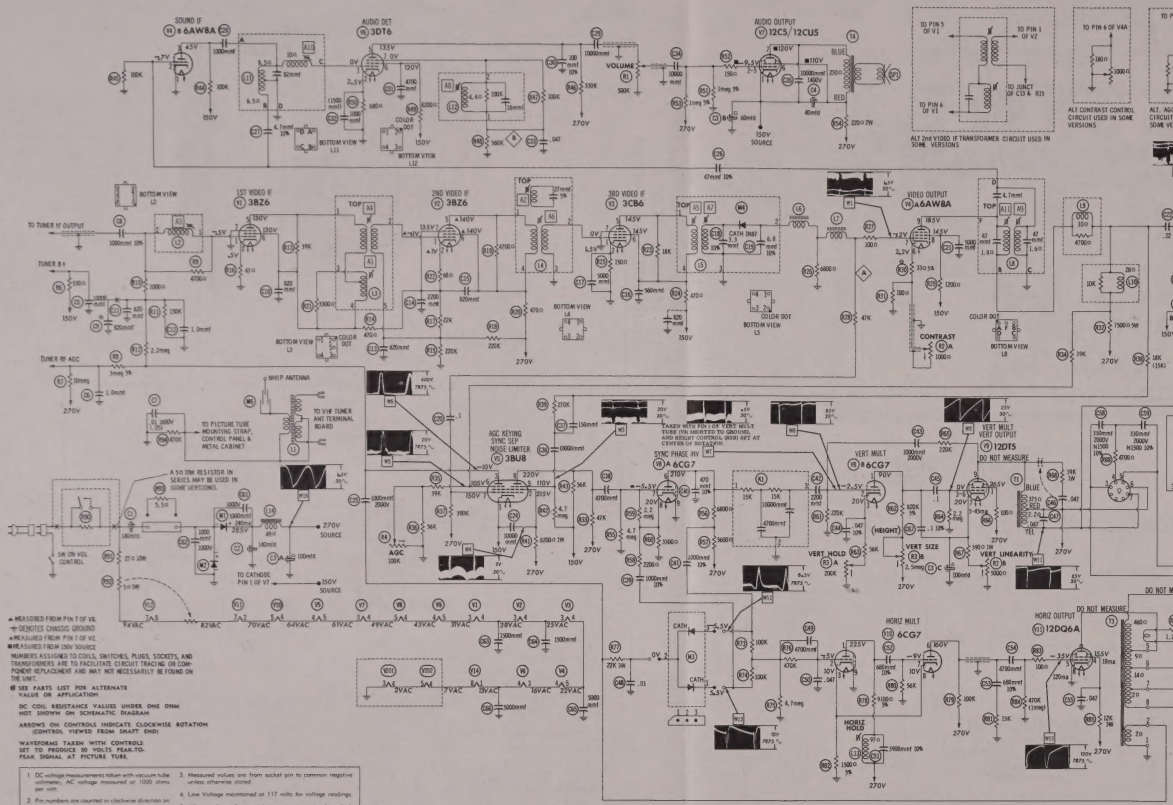
JA659R


SOUND IF
V9 6AW8A
AUDIO DET
V6 3DT6
AUDIO OUTPUT
V7 12C5/12CU5
VOLUME
1ST VIDEO IF
V1 3BZ6
2ND VIDEO IF
V2 3BZ6
3RD VIDEO IF
V3 3CB6
VIDEO OUTPUT
V4 6AW8A
CONTRAST
BRIGHTNESS
PICTURE TUBE
V16 17DTP4
AGC KEYING SYNC SEP MUDE LIMITER
V5 3BU8
SYNC PHASE INV
V8 6CG7
VERT MULT
V9 6CG7
V10 12DT5
VERT HOLD
VERT SIZE
VERT LINEARITY
HORIZ MULT
V12 6CG7
HORIZ OUTPUT
V13 12DQ6A
HORIZ HOLD
HV RECT
V15 1J3
DAMPER
V14 12AX4GTA
DEFLECTION YOKE
TUNER B+
TUNER RF AGC
WHIP ANTENNA
TO TUNER IF OUTPUT
TO PICTURE TUBE MOUNTING STRAP, CONTROL PANEL & METAL CABINET
TO V1 TUNER ANT TERMINAL BOARD
SW ON VOL CONTROL
TO CATHODE PIN 1 OF V7
150V SOURCE
270V SOURCE
480V BOOST
480V BOOST SOURCE
TO PIN 5 OF V1
TO PIN 1 OF V2
TO PIN 6 OF V1
TO JUNCT OF C13 & R35
ALT 2nd VIDEO IF TRANSFORMER CIRCUIT USED IN SOME VERSIONS
TO PIN 6 OF V4A
ALT CONTRAST CONTROL CIRCUIT USED IN SOME VERSIONS
TO PIN 6 OF V5
ALT. AGC CONTROL CIRCUIT USED IN SOME VERSIONS
TO PICTURE TUBE HV ANODE (11KV-13KV) 11.5KV
DO NOT MEASURE
COLOR DOT
BOTTOM VIEW
TOP
A SO 10n RESISTOR IN SERIES MAY BE USED IN SOME VERSIONS.
MEASURED FROM PIN 7 OF V9.
MEASURED FROM PIN 7 OF V2.
MEASURED FROM 120V SOURCE
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1. DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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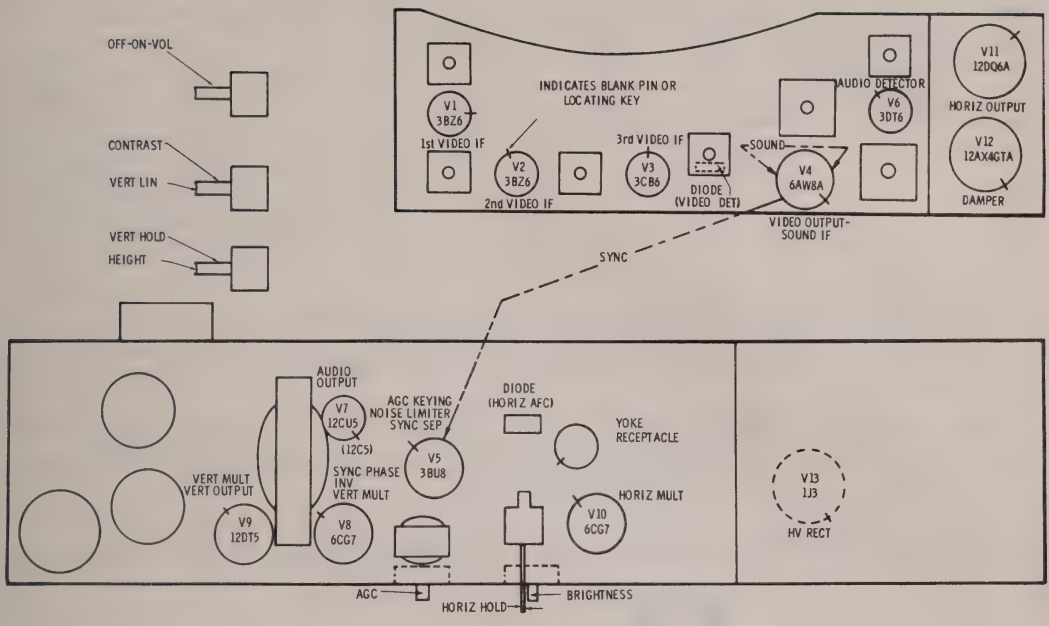
AIRLINE MODELS
GTC-4220A, GTC-4320A

TUBE PLACEMENT CHART

TOP VIEW



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

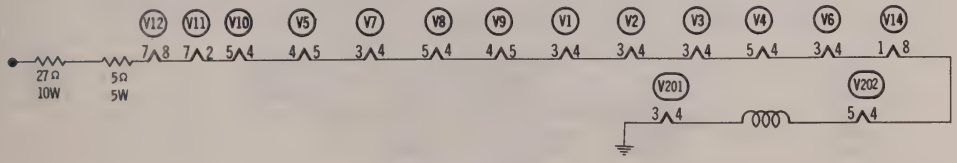
POWER SUPPLY FAILURE
No raster, no sound Fusible Resistor, Rect. (B+)

SWEEP FAILURE
No raster, has sound V10, V11, V12, V13, V14
No vertical deflection V8, V9
Poor vert. linearity or foldover V8, V9
Poor horiz. linearity or foldover V10, V11, V12
Narrow picture V10, V11, V12, Rect. (B+)
Vert. off freq. V8, V9
Horiz. off freq. V8, Diode (Horiz. AFC), V10

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, Diode (Video Det.), V4
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V14
Has pic, no sound V4, V6, V7
Overloaded picture V5

SYNC FAILURE
No vert. sync V5, V8
No horiz. sync V5, V8
No vert. or horiz. sync V5, V8

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



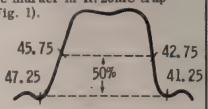
ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #8282, 8606, 8606L, 9295
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Set Contrast fully clockwise.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

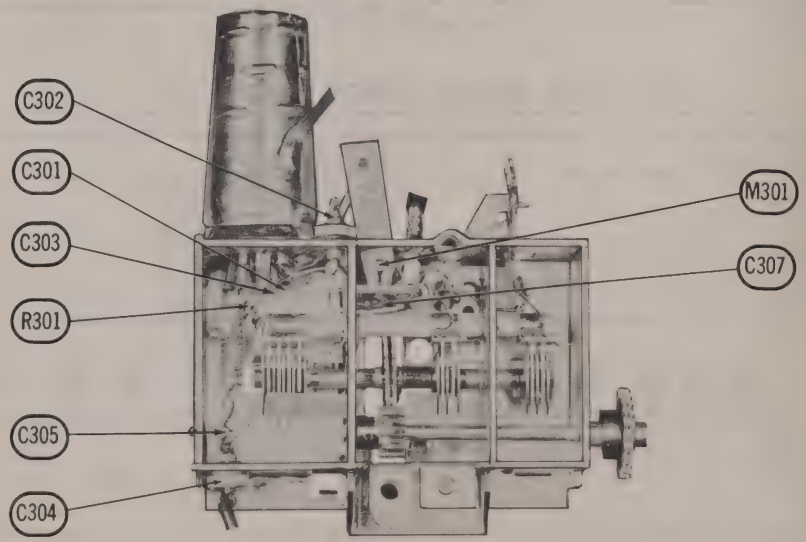
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	44MC (10MC Swp)	41.25MC	Any non-interfering channel	Vert. Amp. thru 47K to point (A). Low side to chassis. (Across Video Det. load)	A1	Adjust to place marker in 41.25MC trap notch. (See Fig. 1). FIG. 1 
2.	"	"	"	47.25MC	"	"	A2	Adjust to place marker in other trap notch.
3.	"	"	"	42.75MC 45.75MC	"	"	Mixer Plate Coil & A3 thru A7	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Adjust Mixer Plate Coil and A3 for maximum gain. A4 and A5 to shape high frequency side of response curve. A6 and A7 is adjusted to shape low frequency side.

SOUND IF ALIGNMENT

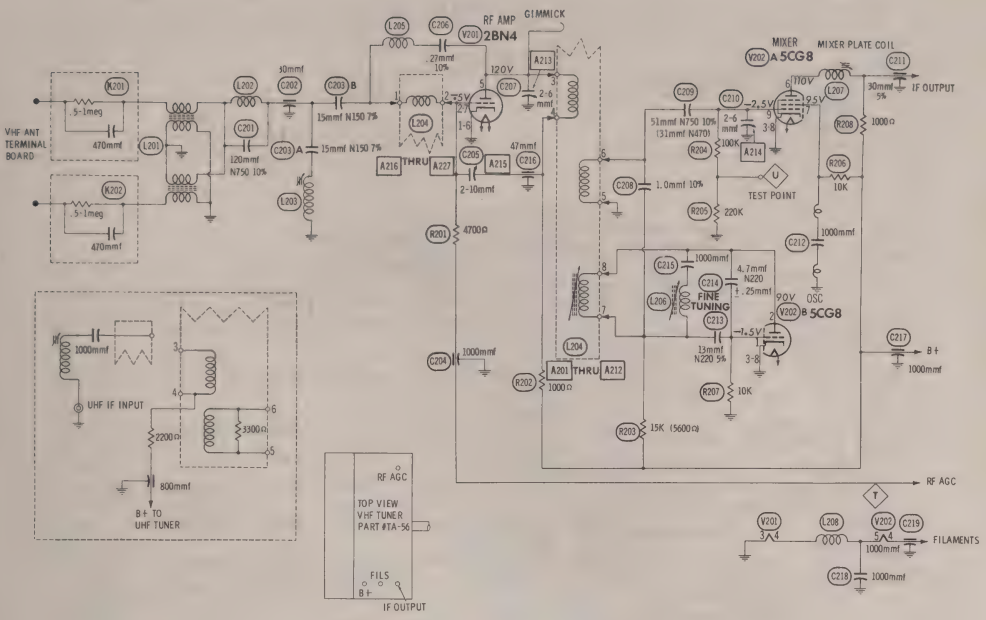
Connect an output meter across speaker voice coil.
Connect the DC probe of the VTVM to point (B). Common to chassis. Tune in a strong air signal and adjust A8 for maximum output. If two peaks occur during this adjustment, use the one resulting in the highest reading on the VTVM.
Reduce the signal strength by disconnecting the antenna. Adjust A9 and A10 for maximum undistorted sound. Further reduce the signal by moving the antenna lead further away. Retouch A9 and A10 for maximum undistorted sound. Repeat entire procedure if necessary.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	.05mfd	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	AC probe to point (C). Common to chassis. (Use 0-10VAC scale).	A11	Adjust for MINIMUM deflection.



UHF TUNER TA-49



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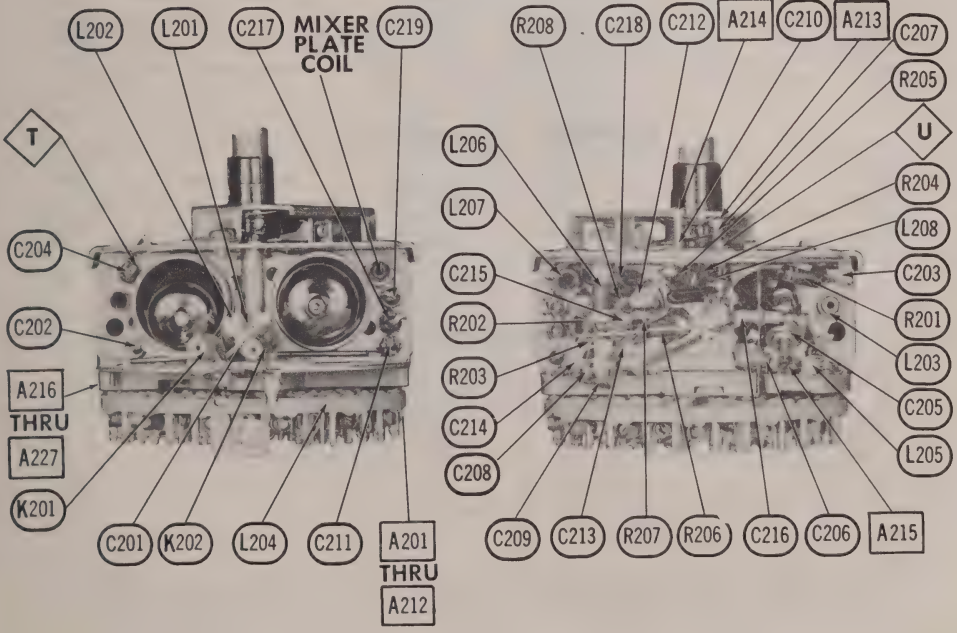
VHF TUNER TA-56



VHF TUNER TA-56

SET 512 FOLDER 1

TUNER PARTS LIST AND DESCRIPTIONS

TA-56

TUBES

• GENERAL ELECTRIC •			• RAYTHEON •			• SYLVANIA •		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V201	RF Amplifier	2BN4	V202	Mixer-Osc.	5CG8			

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	120 N750 10%			TCZ-120	C10T12U	CCTN-121	CN7-312	10TCU-T12
C202	30	#13M350U300N-02						
C203A	15 N150 7%	#13L8PG150N2				* *		10TCP-Q15
B	15 N150 7%					* *		10TCP-Q15
C204	1000		EF-001	MFT-1000		CCF-102	CT280A	
C205	2-10	#31B-902-09		829-10				
C206	.27 10%	#13D-111-45						
C207	2-6			829-6		VC-3	CT552	
C208	1.0 10%		NPO-SI 1.0	TCZ-1			CNO-510	10TCC-V10
C209	51 N750 10%	(31MMF-N470)*		TCN-51		CCTN-470		
C210	2-6			829-6		VC-3	CT522	
C211	30 5%	#13M350U300J-01						
C212	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C213	13 N220 5%	#13L8R130J				* *		10TCR-Q12
C214	4.7 N220 ±.25mmf	#13L8R4R7C				* *		10TCR-V47
C215	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C216	47	#13M130U470J01		MFT-50				
C217	1000		EF-001	MFT-1000		CCF-102	CT280A	
C218	1000		BPD-001	DD-001	BYA10D1	CCD-102	B-210	5HK-D10
C219	1000		EF-001	MFT-1000		CCF-102	CT280A	

"Standard Coil" Part Number.
* Alternate Value
** Not normally in distributor's stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R201	4700Ω	
R202	1000Ω	
R203	15K	(5600Ω) *

ITEM No.	RATING	REMARKS
R204	100K	
R205	220K	
R206	10K	

ITEM No.	RATING	REMARKS
R207	10K	
R208	1000Ω	

* Alternate Value

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	PART No.	REPLACEMENT DATA
K201	Antenna Filter	470mmf, .5-1meg	13P-195	Centralab RC-471 Sprague AC1-1
K202	Antenna Filter	470mmf, .5-1meg	13P-195	Centralab RC-471 Sprague AC1-1

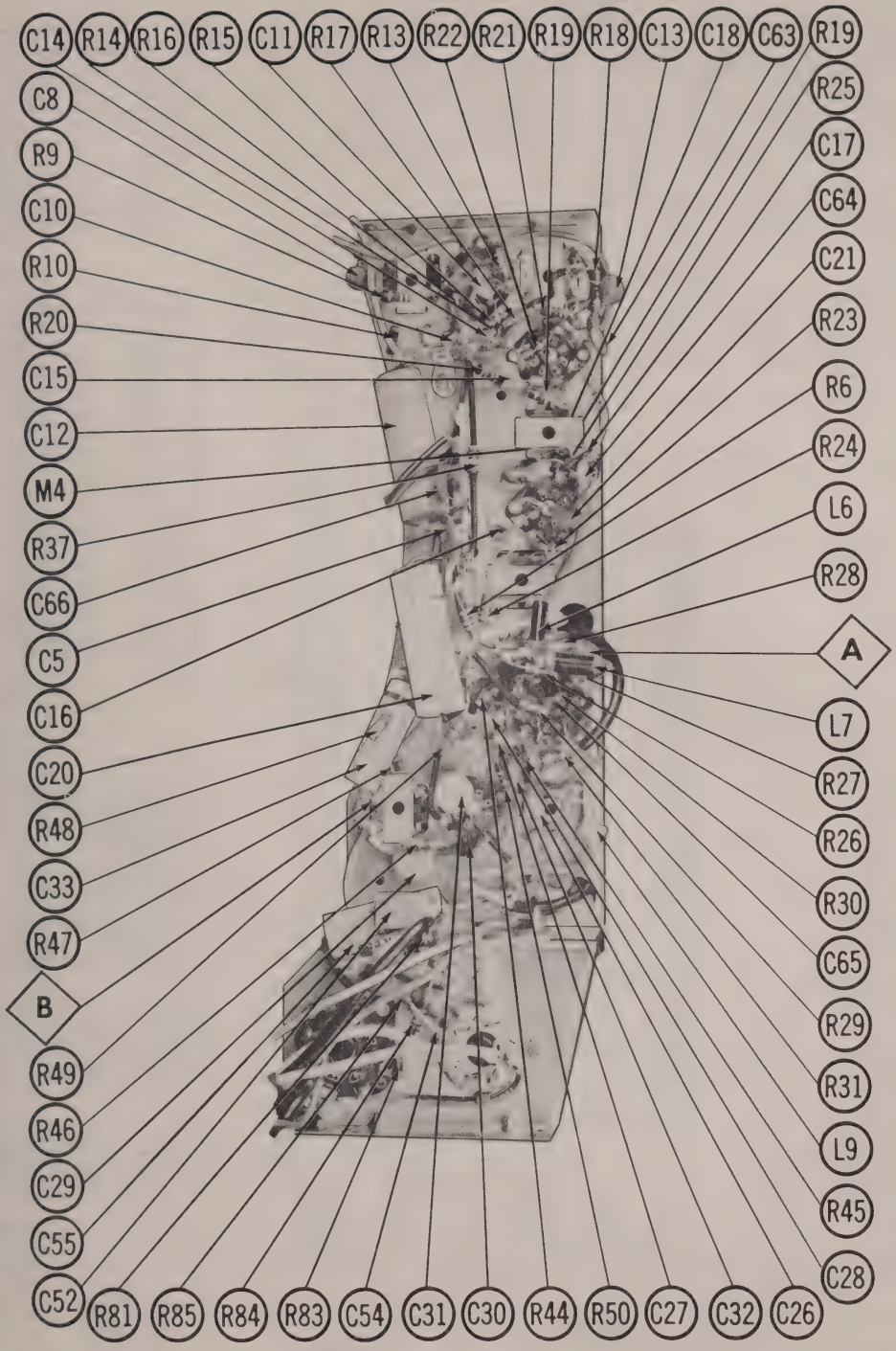
Note : Part numbers listed ablve are "Standard Coil" Part numbers.

COILS (RF-IF)

ITEM No.	USE	PART No.	NOTES
L201	Ant. Trans.	31T-3397	
L202	RF Choke	34A-748	
L203	IF Trap Coil	34A-762	
L204	Ant., RF, Mixer Grid & Osc. Coils	31T-3454-034-000	Channel 2-13 Includes Rotor & Coil Assy.

ITEM No.	USE	PART No.	NOTES
L205	RF Choke	34A-1005	
L206	Fine Tuning Coil	34A-787-03	
L207	Mixer Plate Coil	31UA-580-017	
L208	Fil. Choke	31K-137-027	

Note: Part numbers listed above are "Standard Coil" Part numbers.



UPPER CHASSIS - BOTTOM VIEW

SET 512 FOLDER 1

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	• GENERAL ELECTRIC • USE	TYPE	ITEM No.	• RAYTHEON • USE	TYPE
V1	1st Video IF Amp.	3D26	V7	Audio Output	12CU5/12C5
V2	2nd Video IF Amp.	3D26	V8	3rd Phase Inv - Vert Mult	6CU7
V3	3rd Video IF Amp.	3CB6	V9	Vert Mult - Vert Output	12DT5
V4	Video Output-Sound IF Amp.	6AW8A	V10	Horiz Mult	6CU7
V5	AGC Keying-Sync Sep. - Video Limiter	3BU8	V11	Horiz Output	12DQ6A
V6	Audio Detector	3DT6	V12	Damper	12AX4GTA
			V13	HV Rect	U3

PICTURE TUBE

ITEM No.	REPLACEMENT DATA: ADMIRAL PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
V14	1*DTP4				1TDTP4 ①	① "Silver Screen 89"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP	VOLT	REPLACEMENT DATA: ADMIRAL PART No.	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	140	200	EC-84	AFH3R-37-25X4D386		FP321	TMS-34	TVL-1540	
C2	140	200	EC-158	AFH3R-37-25X4A0356		FP321	TMS-43	TVL-1544	
C3A	400	330	EC-120	AFH54-100-32 D0044		FP434.3	TMQ-159	TVL-4711	
B	400	300		BR1005					
C	4000	50							
C4	40	200	EC-112	PRR580	BR-6035	TC54	TD-40-350	TVA-1511	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C1	10000		BPD-01	DD-103	BYA10B	CCD-103	B-110	5HK-B10
C4	1.0 400V		P1836R-1.0		CUB3W1		GEM-21	2TM-M1
C7	.01 1000V	(05mfd)*	P1804CM-01	DD5E-103	CUB5E	15DP-3-103	GEM-1611	M5-B
C8	1000 10%		DE-1000	DD-102	BR5E	CCD-102	GP100	10TS-D10
C9	820	Note 1	DE-820	DD-82	BYA10T82	D-382	5GA-T82	
C10	820		DE-820	DD-821	BYA10T82	CCD-821	D-382	5GA-T82
C11	820		DE-820	DD-821	BYA10T82	CCD-821	D-382	5GA-T82
C12	1.0 1000V		P1836R-1.0		CUB3W1		GEM-21	2TM-M1
C13	820		DE-820	DD-821	BYA10T82	CCD-821	D-382	5GA-T82
C14	2200		BPD-0022	DD-223	BYA10D22	CCD-223	B-222	5HK-D22
C15	820		DE-820	DD-821	BYA10T82	CCD-821	D-382	5GA-T82
C16	560		DE-560	DD-561	L487S6	CCD-561	D-356	5GA-T56
C17	4000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C18	3 3 10%		NPO-03 3 3	TCZ-3R3	C0V33C	CCTO-3R3	CNO-533	10TCC-Y33
C19	6.8 400V		DTZ-6R8	DTZ-6R8	C0V68C	CCTO-6R8	CNO-568	10TCC-V68
C20	680V		P983N-;		CUB5EP	5DP-4-104	GEM-601	M5-388
C21	5600		BPD-006	DD-562	BYA10D6	CCD-562	B-256	5HK-D60
C23	.23 600V		P988N-23		CUB4P22	6DP-5-234	GEM-6022	
C24	.022 600V		P988N-022	DD-303	CUB5S22	6DP-3-223	GEM-6122	6TM-S22
C25	1000		BPD-01	DD-103	BYA10B	CCD-103	B-110	5HK-B10
C26	1500 2000V		HVD-30-1500	DD30-152	HVB30D5	VCM-35-152	2HV-320	BL-D50
C26	.47 .1kV		NPO-47 47	DD-470	L490K1	CCD-470	GP471	10TS-D47
C27	4.7 10%		NPC-5E 4.7	TCZ-4R7	C1V47C	CCTO-4R7	CNO-547	10TCC-Y47
C28	1000		BPD-005	DD-103	BYA10D5	CCD-103	B-210	5HK-D10
C29	10000		BPD-01	DD-103	BYA10D1	CCD-103	B-110	5HK-B10
C30	100 10%		DE-101	DD-101	L497T1	CCD-101	GP-310	10TS-T10
C31	4700		BPD-047	DD-472	BYA10D47M	CCD-472	B-347	5HK-D47
C33	1000	(2500mmf)*	BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C34	1000		P988N-047	DD-103	BYA10D1	CCD-103	GEM-6047	2TM-S47
C35	10000		BPD-01	DD-103	BYA10B	CCD-103	B-110	5HK-B10
C36	10000		DA6-27	DD8-103	HVY10S6	15DP-3-103	UAC-B10	5HK-B10
C36	10000		BPD-01	DD-103	BYA10B	CCD-103	B-110	5HK-B10
C37	150		BPD-0015	DD-151	L473	CCD-151	B-215	5GA-T15
C38	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-347	5HK-D47
C39	1000 10%		DE-1000	DD-102	1R5D1	CCD-102	GP100	10TS-D10
C40	470 10%		DE-470	DD-471	1R5T47	CCD-471	GP347	10TS-T47
C41	1000 10%		DE-1000	DD-102	1R5D1	CCD-102	GP100	10TS-D10
C42	2200		BPD-0022	DD-222	BYA10D22	CCD-222	B-222	5HK-D22
C43	4000 2000V		HVD-30-4000	DD30-402	HVB30D5	VCM-35-402	2HV-320	BL-D50
C44	.047 600V 10%		Y5AC5S47-10%		CUB5EP	6DP-3-473	GEM-1615	6TM-S47
C45	1 50V		P983N-;	DY-104	CUB5EP	5DP-4-104	GEM-601	5TM-P1
C46	.047 600V		P988N-047	DD-503	CUB5S47	6DP-3-473	GEM-6147	6TM-S47
C47	.047 600V		P988N-047	DD-503	CUB5S47	6DP-3-473	GEM-6147	6TM-S47
C48	.01 600V		P983N-01	DD-103	CUB5E	5DP-2-103	GEM-611	5TM-S1
C49	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-347	5HK-D47
C50	.047 200V		P988N-047	DD-503	CUB5S47	4DP-3-473	GEM-6147	2TM-S47
C51	1000 10%		1656-0019		1R5D10	CW-3DB-681K	MC2649	M5-388
C52	680 10%		1656-00068	DD-681	1R5T68	CW-3DB-681K	MC2349	M5-388
C53	680 10%		1656-00068	DD-681	1R5T68	CW-3DB-681K	MC2349	M5-388
C54	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-347	5HK-D47
C55	.047 600V		P988N-047	DD-503	CUB5S47	6DP-3-473	GEM-6147	6TM-S47
C56	.027 1000V		P1804CM-027	DD5E-303	CUB5D27	15DP-3-203	GEM-1627	10TM-S27
C57	.047 1000V		P1888N-047		CUB5G47	15DP-5-473	GEM-10647	10TM-S47
C58	330 2000V 10,500 10%	ECC-119				**		
C59	330 2000V 10,500 10%	ECC-119				**		
C60	120 2000V 8750 5%					**		
C61	1000 1000V		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C62	1000 1000V		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C63	1500		BPD-002	DD-152	BYA10D5	CCD-152	B-215	5HK-D15
C64	1500		BPD-002	DD-152	BYA10D5	CCD-152	B-215	5HK-D15
C65	5000		BPD-006	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C66	5000		BPD-006	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C67	1 600V 10%		Y5AC5P1-10%		CUB5EP	5DP-4-104	GEM-601	5TM-P1

* Alternate value. Note 1: Not used in some versions.
** Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: ADMIRAL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A B	500K Switch	1	VC-120	SPL-40 Not Req.	C1S-500K-2 KS0-3	B13-533 Not Req.	PP51A Not Req.	Volume Push-Pull Off-On

CONTROLS (cont)

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: AIRLINE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R2A	500Ω	1	VC-195	PI-53			‡ Ⓤ-1129	■ Ⓤ#4067 Contrast
B	500Ω			K2-19				Vert. Lin.
R3A	200K		VC-194	PI-33			‡ Ⓤ-1130	■ Ⓤ# 4121 Vert. Hold
B	2.5meg			RS-76				Vert. Size
R4A	100K	1	VC-84	BX-40	B47-100K-S	B11-138	PTA81,	AGC
B	2MΩ			Not Req.	Not Req.	T164	PTA81,	
R5A	100K	1	VC-84	BX 40	B47-100K-S	B11-138	PTA81,	Brightness
B	Shaft			Not Req.	Not Req.	T164	Not Req.	

† "Concentrite" Equivalent: K-16 K2i with Base Elements & Shafts: B17-102, P17-025S (Panel)
‡ "Concentrite" Equivalent: K-16 K2i with Base Elements & Shafts: B11-114, R15-005 (Rear)
(Not available as a factory assembled unit) B11-129, P17-025S (Panel)
■ "STA-LOC" Equivalent: FA13S, RU53L, C0875A, 18437 B11-129, R15-005 (Rear)
● "STA-LOC" Equivalent: FA81L, RU55L, C0875A, 18437.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R6	330Ω	
R7	0meg	
R8	3meg 5%	
R9	4700Ω	
R10	10000	
R11	180K	
R12	2 2meg	
R13	39K	
R14	470Ω	
R15	330K	
R16	47Ω	
R17	33K	
R18	220K	
R19	4700Ω	
R20	470Ω	
R21	3300Ω	
R22	68Ω	
R23	18K	
R24	4700	
R25	100Ω	
R26	6800Ω	
R27	100Ω	
R28	47K	
R29	1300Ω	
R30	33Ω 5%	Note 1
R31	180Ω	
R32	7500Ω 5W	#WR-45
R33	47K	
R34	39K	
R35	39K	

ITEM No.	RATING	REMARKS
R36	56K	
R37	390K	
R38	18K	(18K)*
R39	270K	
R40	82K	
R41	82000 1W	
R42	4. 7meg	
R43	56K	
R44	100K	
R45	100K	
R46	330K	
R47	100K	
R48	560K	
R49	8200Ω	
R50	680Ω	
R51	1meg 5%	
R52	150Ω	
R53	1meg 5%	
R54	220Ω 2W	
R55	4. 7meg	
R56	680Ω	
R57	560Ω	
R58	2200Ω	
R59	3. 3meg	
R60	330Ω	
R61	220K	
R62	220K 5%	
R63	56K	
R64	2. 2meg	
R65	220K	

ITEM No.	RATING	REMARKS
R66	100Ω	
R67	3900 1W	
R68	39K 1W	
R69	39K 5%	
R70	220Ω	
R71	220Ω	
R72	3. 9Ω Cold	#IR-284
R73	100K	
R74	100K	
R75	4. 7meg	
R76	330K	
R77	22K 3W	
R78	9000Ω 5%	#IR-285
R79	100K	
R80	56K	
R81	15K	
R82	1500Ω 5%	
R83	100Ω	
R84	470K	(5meg)*
R85	12K 3W	
R86	150K	
R87	470K	
R88	4700Ω	
R89	1. 2Ω 1W	
R90		#F-9
R91	27Ω 10W	#WR-26
R92	2Ω 5W	#WR-42
R93	5. 5Ω	#F-6-1
R94	470K	

* Alternate value. Note 1. Not used in some versions.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	NOTES
L1	Ant. Matching	L-157				
L2	1st Video IF	L-150		6331 *		* Disregard Secondary Winding.
L2A	2nd Video IF	L-103				
B	4. 25MC Trap					
L4A	3rd Video IF	L-185	TV-128	6333	RTC-8561	
B	47. 35MC Trap					
L5	4th Video IF	L-152				
L6	RF Choke (10. 6uh)	L-160	BC-586	4612	RTC-8532	
L7	RF Choke (27. 5uh)	L-158				
L8A	Sound Takeoff	L-154				
B	4. 5MC Trap					
L9	Series Peaking	L-163				Wound on 4700Ω Resistor.
L10	Shunt Peaking	L-163				Wound on 10K Resistor.
L11	2nd Sound IF	L-167				
L12	Quadrature Coil	L-112A		1491 ▲	RTC-8606 ▲	▲ Parallel with 100K Resistor.

COILS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Rogers PART No.	Thordarson PART No.	Triad PART No.	NOTES
L13	Horiz. Stabilizer	L-156	TV-163 *	6310 *	RC110 *	RTC-8632*	HS-5 *	WLC-25 *	

* Enlarge Mounting Hole.

FILTER CHOKE

ITEM No.	RATING: CURRENT (Measured)	DC RES.	INDUCTANCE @ CURRENT (000 "L")	REPLACEMENT DATA: AIRLINE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
L14	.340A	49Ω	1 Hy.	FC-5B					

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	Merit PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	Vert. Output	TR-50B				26H4	A-140X	
T2	Yoke-Horiz. (18. 7MΩ (10%)-Vert. (12. 5MΩ) Rear Cover & Centering Device Yoke Clamp	L-149B MP-165			DY-37A ①②③	Y-52 ①②③	Y-60 & NW-25 ②③ YC-110		
T3	Horiz. Output	ST-58 TR-51A	HVO-152 *	EFR172 *	HO-304 *	FLY-137 *	D-151R *		

① Use original rear cover, centering device, and yoke clamp.
② Use original yoke plug.
③ Connect as original.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL (CONNECTIONS)	Merit Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
5	5	5	5	5	5 & 4
6	6	4	6	6	6
7	7	2	7	7	7
8	8	1	8	8	8
2	2	7	2	1	2
1	1	8	1	2	1
Special Notes **		④			

④ Remove one turn from filament winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: AIRLINE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T4	2600Ω	3-4Ω	AT-52	A-3025	A-3332	24S53	S-12X	

SPEAKER

ITEM No.	TYPE: SIZE	FIELD	V C IMP	REPLACEMENT DATA: AIRLINE PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	SPK-49	4A07	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA
K1	Vert. Integrator	470mmf, 10000mmf, 15K, 15K	CC-120	

RECTIFIERS

ITEM No.	RATING: CURRENT (Measured)	REPLACEMENT DATA: AIRLINE PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.240A	SR-14 ①	1N1763 ①	40K ①	SR500 ①	1N1763 ①	① Silicon Type
M2	.340A	SR-14 ①	1N1763 ①	40K ①	SR500 ①		② Dual Selenium Diode (Common Cathode Type)
M3		SR-18 ②	6GCI ②				

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: AIRLINE PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M4	1N87	SC-33	1N87	1N90	Video Det. (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M5	Tuner	TA-56	VHF with UHF Provisions
	Tuner	TA-49	UHF
M6	Antenna	L-148	Telescopic, JFD REPLACEMENT #TA377

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

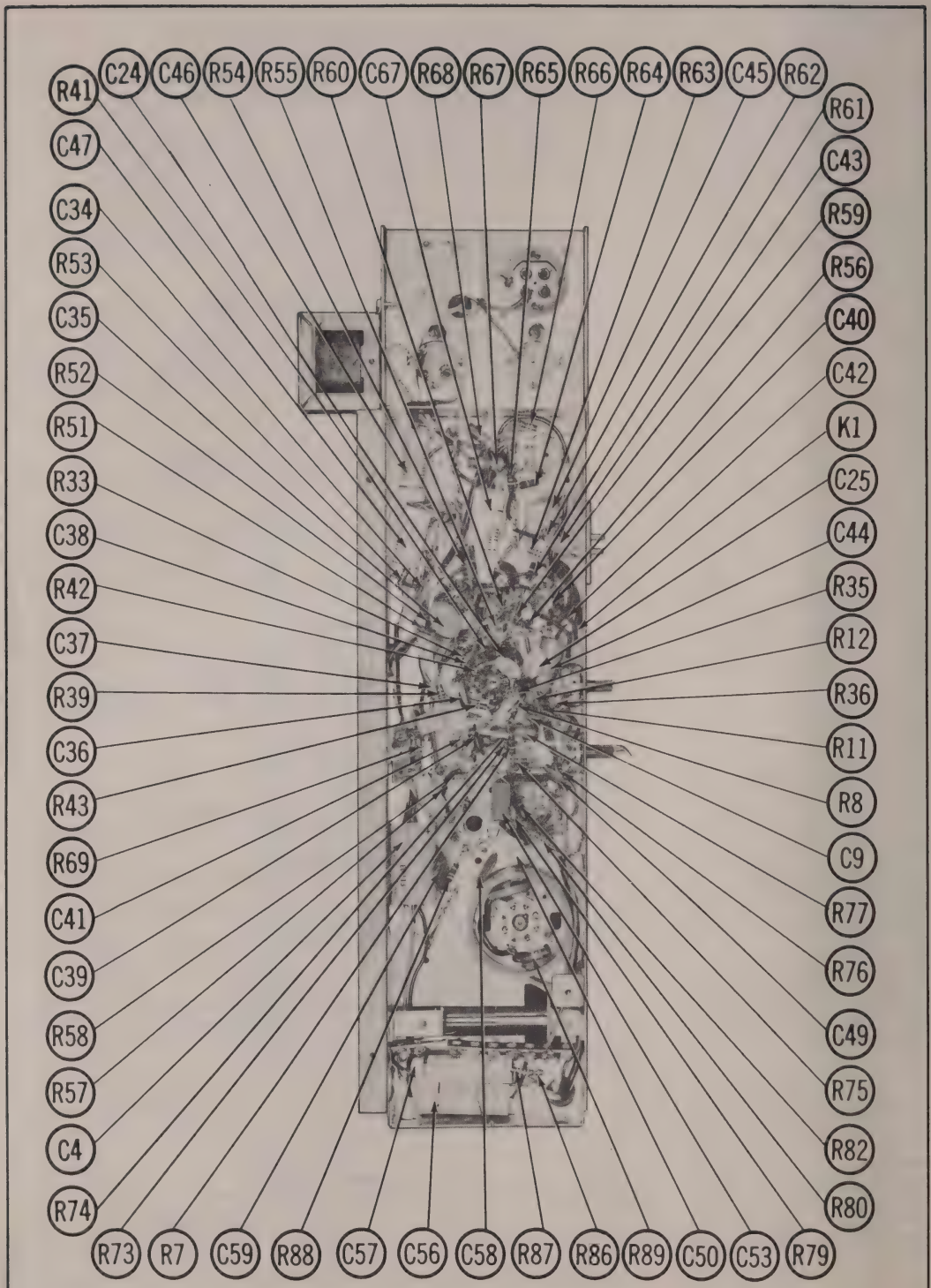
NAME	PART NO.	DESCRIPTION
Safety Glass	MP-139	
Cabinet Front	MP-140	Plastic
Knob	K-349	Channel Selector, VHF
Knob	K-350	Fine Tuning
Knob	K-355	Volume
Knob	K-356	Contrast, Vert. Hold
Knob	K-369	UHF Tuning
Knob	K-370	UHF Channel Indicator
Handle	CH-106	Cabinet

WIRING DATA

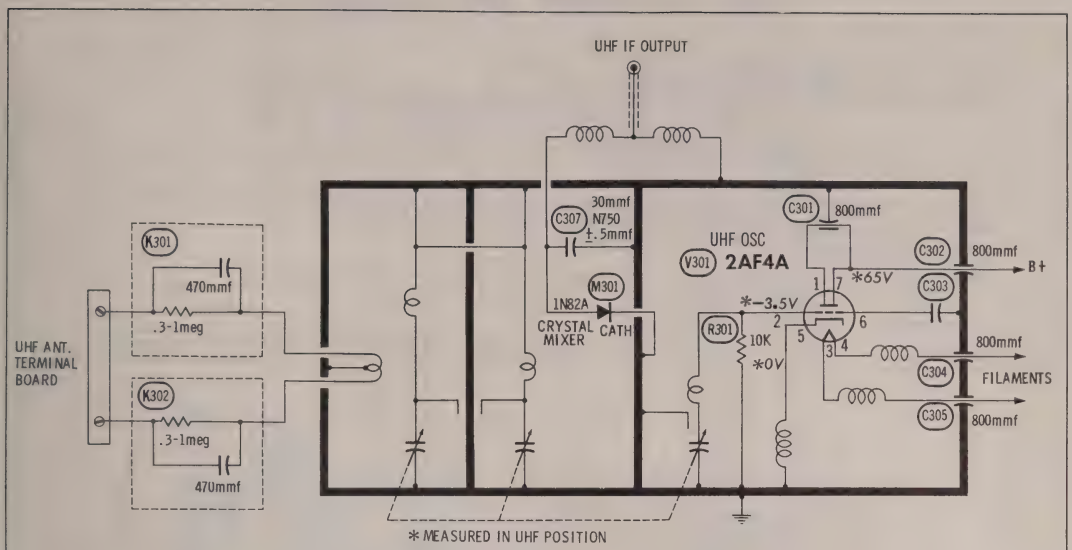
High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8585 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8876
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8404 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8486 (Round) - 8 Conductor

AIRLINE MODELS GTC-4220A, GTC-4320A

FOLDER 1



LOWER CHASSIS - BOTTOM VIEW



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
	• GENERAL ELECTRIC •		RAYTHEON •		SYLVANIA •
V301	UHF Osc.	2AF4A			

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C301	800		EF-001	MFT-1000		CCF-102	CT280A	
C302	800		EF-001	MFT-1000		CCF-102	CT280A	
C303								
C304	800		EF-001	MFT-1000		CCF-102	CT280A	
C305	800		EF-001	MFT-1000		CCF-102	CT280A	
C306	1000		BPD-001	DD-102	BYA10D1M	CCD-102	GP210	
C307	30 N750 ±.5mmf							10TCU-Q30

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		PART No.	NOTES
	OHMS	WATT		
R301	10K			

ITEM No.	RATING		PART No.	NOTES
	OHMS	WATT		

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	PART No.	REPLACEMENT DATA	
K301	UHF Antenna Isolation	470mmf, .3-1meg		Centralab Sprague	RC-471 AC1-1
K302	UHF Antenna Isolation	470mmf, .3-1meg		Centralab Sprague	RC-471 AC1-1

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M301	1N82A		1N82A	1N82A	UHF Mixer (Clip-in)

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A201 thru A212 ..... GENERAL CEMENT #8282, 8606, 8606-L, 9091
WALSCO #2526, 2541, 2542, 2543, 2544
A213 thru A215 ..... GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528

VHF OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across Video Det. load.	A201	Adjust to place sound marker in trap notch as in Fig. 201. Video marker should fall at 50%.
		207MC	205.25MC 209.75MC	12		A202	
		201MC	199.25MC 203.75MC	11		A203	
		195MC	193.25MC 197.75MC	10		A204	
		189MC	187.25MC 191.75MC	9		A205	
		183MC	181.25MC 185.75MC	8		A206	
		177MC	175.25MC 179.75MC	7		A207	
		85MC	83.25MC 87.75MC	6		A208	
		79MC	77.25MC 81.75MC	5		A209	
		69MC	67.25MC 71.75MC	4		A210	
		63MC	61.25MC 65.75MC	3		A211	
		57MC	55.25MC 59.75MC	2		A212	

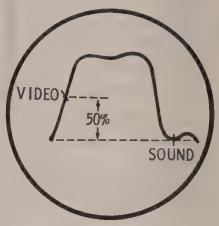


FIG. 201

VHF RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Connect the negative lead of a 4.5 volt bias supply to point (T). Positive to chassis.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Across antenna terminals with 120Ω in each lead.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point (U). Low side to chassis.	A213 A214 A215	Adjust A213 and A214 for maximum amplitude and symmetry with markers as shown in Fig. 202. Increase bias for MINIMUM amplitude of response curve. Without changing the bias adjust A215 to obtain MINIMUM response on the scope.
3.	"	213MC	211.25MC 215.75MC	13	"	A216	Adjust for maximum amplitude of response similar to Fig. 202. Adjust by expanding or compressing coil turns.
		207MC	205.25MC 209.75MC	12		A217	
		201MC	199.25MC 203.75MC	11		A218	
		195MC	193.25MC 197.75MC	10		A219	
		189MC	187.25MC 191.75MC	9		A220	
		183MC	181.25MC 185.75MC	8		A221	
		177MC	175.25MC 179.75MC	7		A222	
		85MC	83.25MC 87.75MC	6		A223	
		79MC	77.25MC 81.75MC	5		A224	
		69MC	67.25MC 71.75MC	4		A225	
		63MC	61.25MC 65.75MC	3		A226	
		57MC	55.25MC 59.75MC	2		A227	

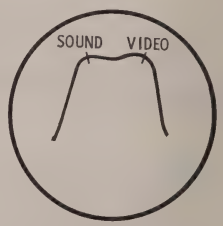
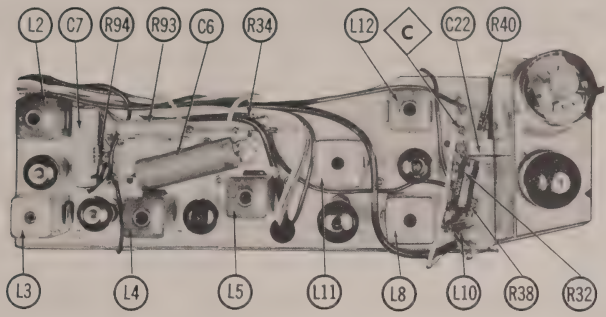


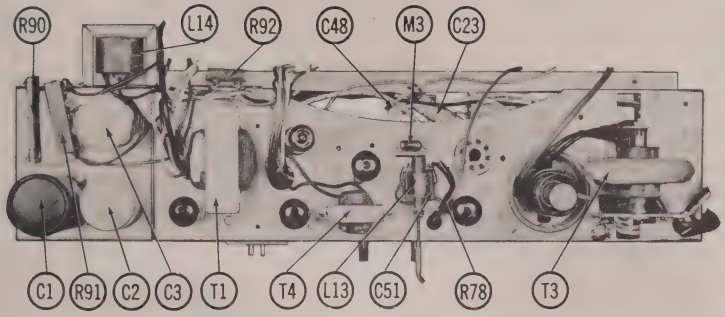
FIG. 202

UHF ALIGNMENT

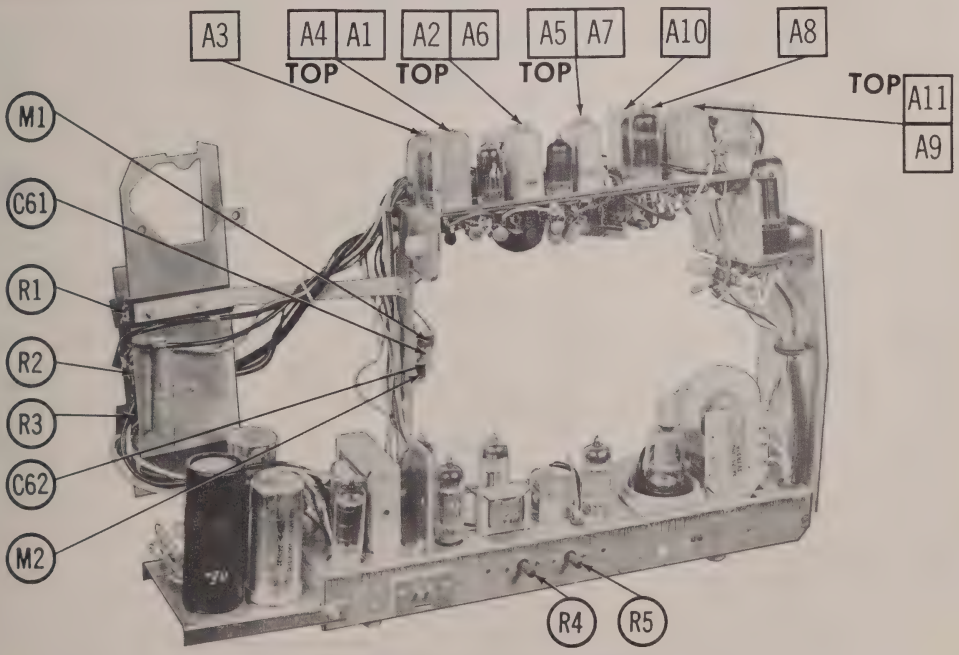
This portion of the tuner has been properly aligned at the factory and is very stable. Alignment of this portion should not be attempted in the field.



UPPER CHASSIS - TOP VIEW



LOWER CHASSIS - TOP VIEW



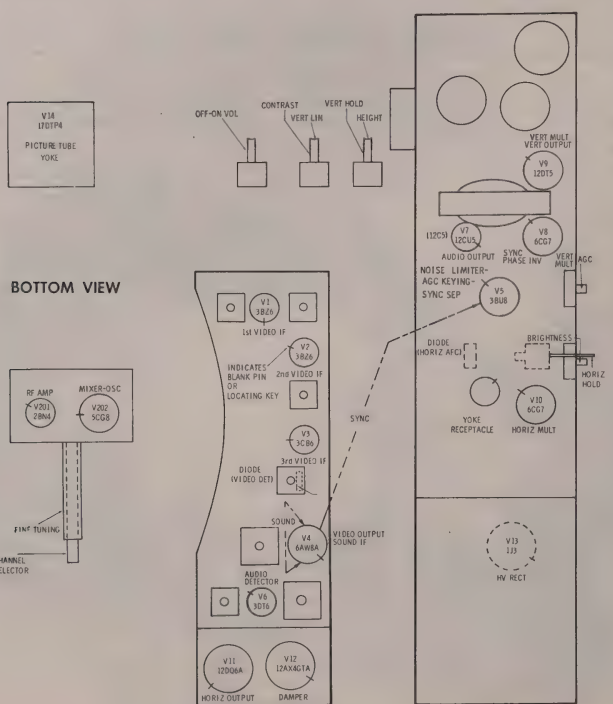
CHASSIS - REAR VIEW

RESISTANCE MEASUREMENTS

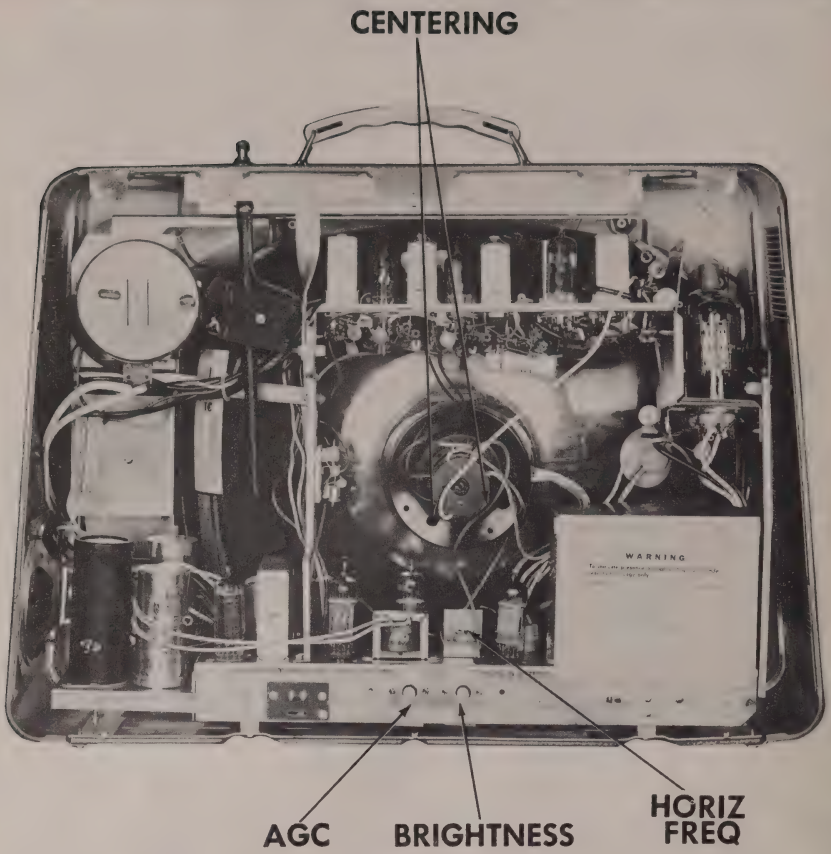
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BZ6	140K	47Ω	6.5Ω	6Ω	▲ 470Ω	▲ 470Ω	0Ω		
V2	3BZ6	▲ 22K	▲ 68Ω	6Ω	5.5Ω	†470Ω	†470Ω	120K		
V3	3CB6	.1Ω	150Ω	5.5Ω	5Ω	■ 470Ω	■ 470Ω	0Ω		
V4	6AW8A	0Ω	100K	■ 100K	3.5Ω	5Ω	● 45Ω	6900Ω	■ 1200Ω	†7500Ω
V5	3BU8	■ 0Ω	†8200Ω	2.3meg	14Ω	13Ω	†35K	†390K	†40K	■ 4.7meg
V6	3DT6	18.5Ω	680Ω	3.5Ω	2.5Ω	†330K	■ 8200Ω	560K		
V7	12CU5/ 12C5	¶	550K	13Ω	10.5Ω	550K	†220Ω	†450Ω		
V8	6CG7	● †1.2meg	220K	● 110K	9Ω	10.5Ω	†12K	2meg	3300Ω	0Ω
V9	12DT5	†100Ω	NC	2.2meg	9Ω	6.5Ω	2.2meg	● 650Ω	NC	†375Ω
V10	6CG7	†9200Ω	2.8meg	1500Ω	14Ω	15.5Ω	†100K	56K	1500Ω	0Ω
V11	12DQ6A	NC	15.5Ω	NC	†12K	470K	TP	18Ω	0Ω	TOP CAP †9Ω
V12	12AX4GTA	NC	NC	¶700K	NC	†0Ω	NC	21Ω	18Ω	
V13	1J3	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †470Ω
V14	17DTP4	2.5Ω	39K	ǂ150K	†0Ω	NC	39K	●120K	1.5Ω	
V201	2BN4	0Ω	3.7meg	0Ω	.5Ω	■1300Ω	0Ω	3.7meg		
V202	5CG8	10K	■ 5900Ω	0Ω	1.5Ω	.5Ω	■ 1300Ω	■ 10K	0Ω	320K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
▲ MEASURED FROM PIN 7 OF V2.
■ MEASURED FROM 150V SOURCE.
† MEASURED FROM 270V SOURCE
ǂ MEASURED FROM PIN 3 OF V12.

NC NO CONNECTION.
TP TIE POINT.



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Set the Brightness and Contrast controls for a normal picture.

Turn the Horizontal Frequency (Hold) clockwise until the picture loses sync. It may be necessary to switch off channel and back again for picture to lose sync.

Turn the Horizontal Frequency slowly counterclockwise until the picture just falls into sync.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 5 push-on type knobs from the front of cabinet.
2. Remove 6 metal screws holding rear cover. Remove antenna connections. Remove rear cover.
3. Remove 5 metal screws holding front glass. Remove the front glass.
4. Remove 3 metal screws holding front control bracket to picture tube mounting strip.
5. Remove speaker leads, picture tube socket, yoke plug, antenna lead and HV lead.
6. Remove 4 chassis bolts from bottom of cabinet and one one each side of chassis.
7. Remove chassis.

PHOTOFACT® Folder with CIRCUITRACE®

**GENERAL ELECTRIC
CHASSIS M6**

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

GENERAL ELECTRIC
CHASSIS M6

GENERAL ELECTRIC
CHASSIS M6

MODEL R740VCD (CH. M6)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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MODEL R740VCD (CH. M6)

TRADE NAME	GENERAL ELECTRIC CHASSIS M6
MODELS	M304VGR, M305VGR, M306VWD, M307VWD, M308VBG, M310VEB, VVY, M311VVY, M420VBZ, VEB, VMD, VOA, M421VEB, VMD, M424VMD, M426VGL, VWD, M427VWD, M430VBN, M431VBN, M432VMD, VOA, M433VMD, VOA, M734VMD, VWD, M736VMD, VOA, VWD, M737VMD, VWD. M738VMD, VOA, VWD, M739VOA, VWD, M740VMD, VMP, VOA, M741VMD, VMP, M750VMD, VMP, VWD, M751VMD, VWD, M782VMD, VWD, M783VWD, R306VWD, R310VVY, R420VMD, R432VMD, VOA, R738VMD, VMP, VWD, R740VCD, VMD, VWD, R741VMD, R750VCD, VMD, VWD
MANUFACTURER	General Electric Co., Appliance & Television Receiver Div., Louisville, Kentucky
TYPE SET	Television Receiver (Some Models with Remote Control, FM-AM 100 Tuner, Stereo Amplifier, and 4 Speed Automatic Record Changer).
TUBES	TV: VHF - Sixteen, UHF - Seventeen; Remote Control Receiver: Three FM-AM Tuner: Eleven; Stereo Amp.: Five
TRANSISTORS	Remote Control Transmitter: Two
POWER SUPPLY	110-125 Volts AC, 60 Cycle
RATING	VHF TV w/Remote: 260 Watts, 2.4 Amp. @ 117 Volts AC (While Tuning) 180 Watts, 1.6 Amp. @ 117 Volts AC (Not Tuning) TV Only: 175 Watts, 1.5 Amp. @ 117 Volts AC
TUNING RANGE	TV: Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) FM-AM Radio: Broadcast 540-1600KC (IF 455KC) FM 88-108MC (IF 10.7MC)

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

Remove 4 screws holding the trim strip at the bottom edge of the safety glass. Tilt glass out and remove.

FUSE

TV: A 3½A line fuse is used for receiver protection. (For location, see M3, "TV Chassis - Front View".)
A 3/8A fuse is used for horizontal sweep protection. (For location, see M2, "TV Chassis - Rear View").
A fuse wire is used for filament protection. (For location, see M4 in Printed Board Photo "Capacitor & Misc. Ident.")

TUNER OSCILLATOR ADJUSTMENT

To touch up the VHF Oscillator, it is necessary to remove the tuner. (See "Disassembly Instructions" page 36).

AGC

No provision is made to vary the AGC on this receiver.

FOCUS

The focus may be varied by connecting the lead from pin 4 of the picture tube thru a 1meg resistor to various voltage points. (For location, see Printed Board Photo of "Capacitor, Misc., Test Point, & Focus Point Ident.")

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Coarse adjustment of the Horizontal Hold is accomplished by the proper setting of the Horizontal Frequency Slug (B1). (For location, see "Tube Placement Chart".)

WIDTH

The width may be varied by a Width Switch. (For location, see "Tube Placement Chart".)

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

PINCUSHION CORRECTION

NOTE: Magnets (in plastic holders) at top and bottom of yoke flange. When re-locating magnets, observe polarity paint code.

Reduce Vertical Size so that the top and bottom of raster edges show. If slight correction is needed, mount magnets to rear side of flange. If more correction is needed, mount magnets to front side of flange.

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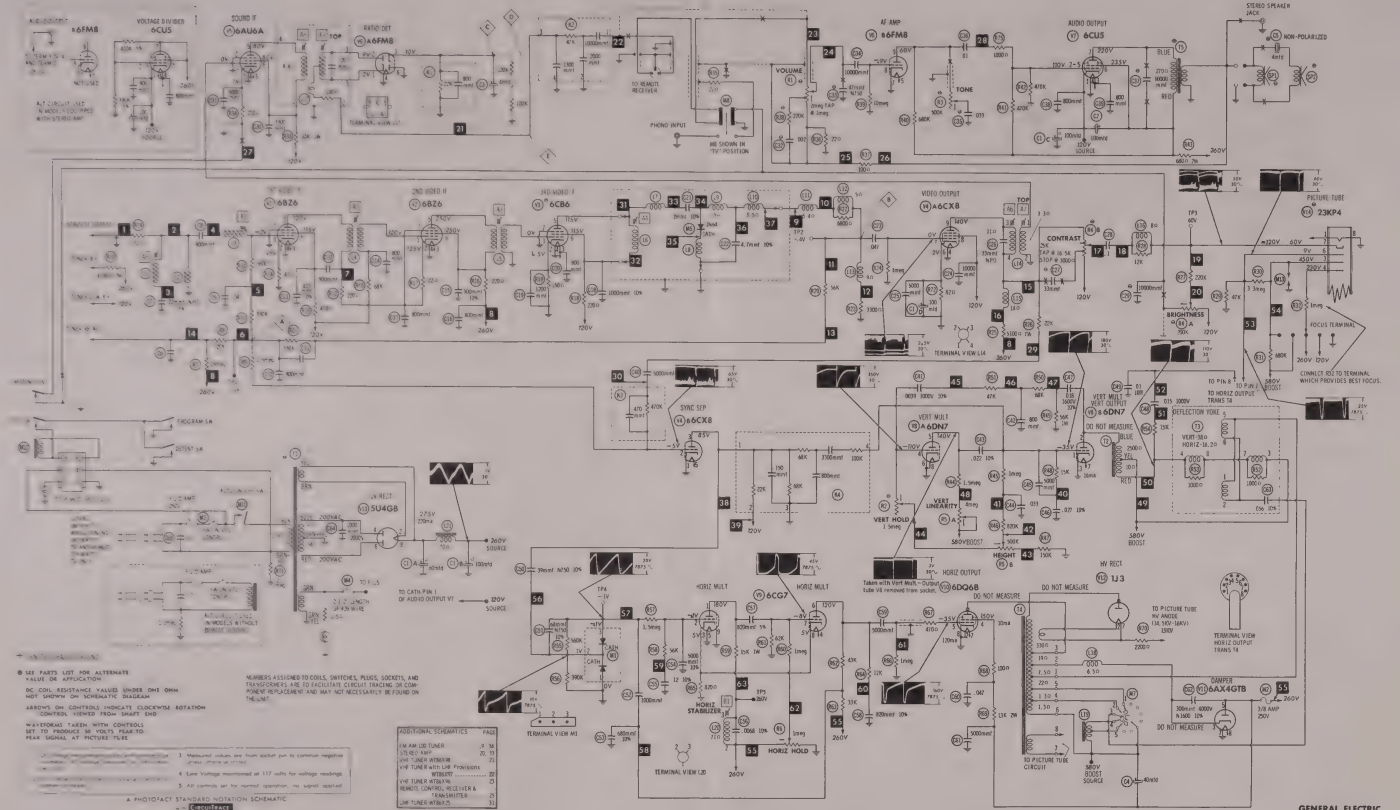
KA392

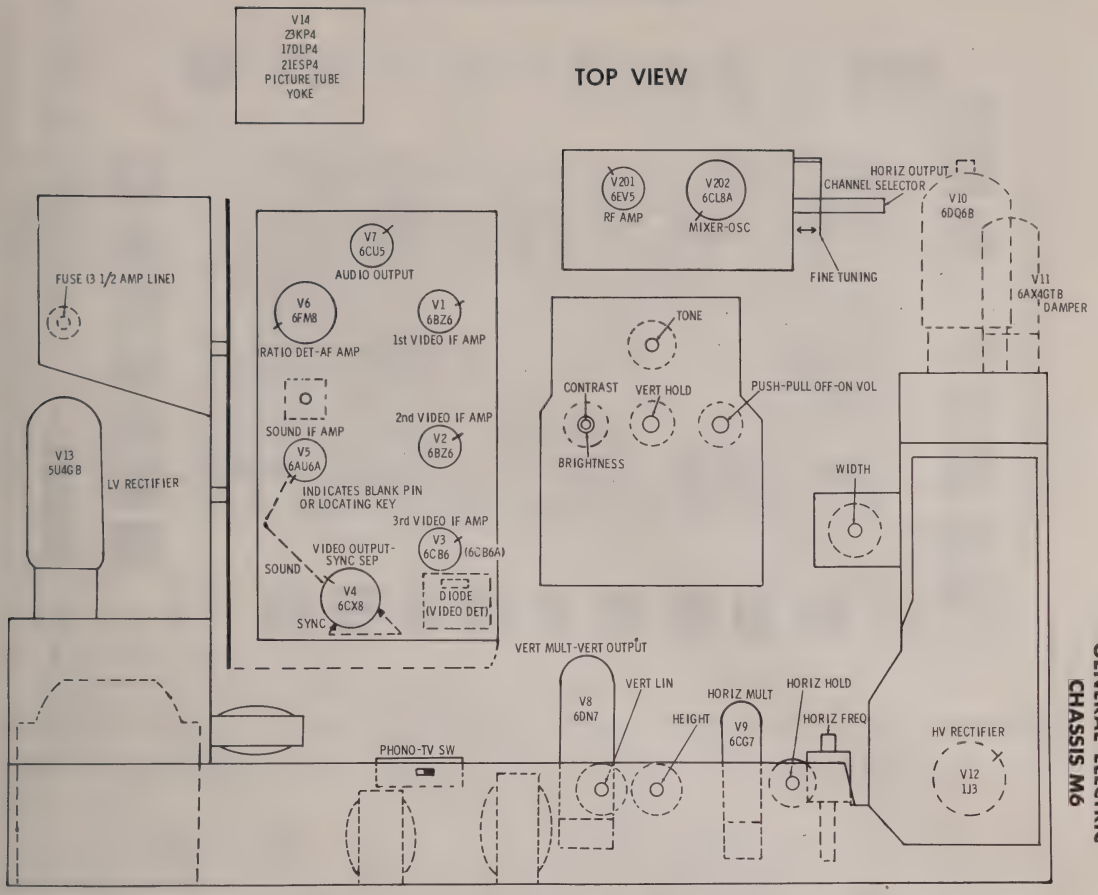
GENERAL ELECTRIC
CHASSIS M6

GENERAL ELECTRIC
CHASSIS M6

SET 512 FOLDER 2


AUDIO DETECT
A6FM8
VOLTAGE DIVIDER
6CU5
SOUND IF
A6AU6A
RATIO DET
A6FM8
AF AMP
A6FM8
AUDIO OUTPUT
6CU5
STEREO SPEAKER JACK
NON-POLARIZED
VOLUME
TONE
PHONO INPUT
TO REMOTE RECEIVER
2ND VIDEO IF
6BZ6
2ND VIDEO IF
6BZ6
VID VIDEO IF
6CB6
VIDEO OUTPUT
A6CX8
CONTRAST
BRIGHTNESS
PICTURE TUBE
23KP4
FOCUS TERMINAL
SYNC SEP
A6CX8
VERT MULT
A6DN7
VERT MULT
A6DN7
VERT LINEARITY
VERT HOLD
HEIGHT
DO NOT MEASURE
REFLECTION YOKE
HORIZ MULT
6CG7
HORIZ MULT
HORIZ OUTPUT
6DQ6B
DO NOT MEASURE
HV RECT
1J3
DO NOT MEASURE
HORIZ STABILIZER
HORIZ HOLD
DAMPER
6AX4GTB
DO NOT MEASURE
RECTIFIER
5U4GB
260V SOURCE
120V SOURCE
TERMINAL VIEW M3
TERMINAL VIEW L20
TERMINAL VIEW HORIZ OUTPUT TRANS T4
TO PICTURE TUBE HV ANODE (14.5 KV-16KV)
TO PICTURE TUBE CIRCUIT
260V BOOST SOURCE
TO PIN 8
TO PIN 6
TO HORIZ OUTPUT TRANS T4
CONNECT EXT TO TERMINAL WHICH PROVIDES BEST FOCUS.
GENERAL ELECTRIC
CHASSIS M6

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

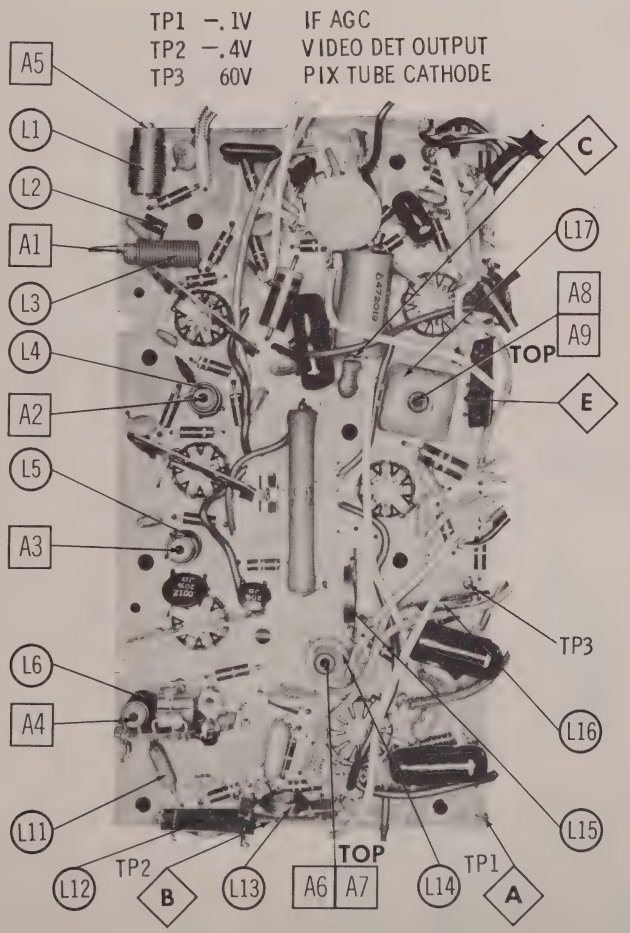
The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound Fuse (Line), Fuse (Fil.), V13

SWEEP FAILURE
No raster, has sound V9, V10, Fuse (Sweep), V11, V12, V14
No vertical deflection V8
Poor vert. linearity or foldover V8
Poor horiz. linearity or foldover V9, V10, V11
Narrow picture V9, V10, V11, V13
Vert. off freq. V8
Horiz. off freq. Diodes (Horiz. AFC), V9

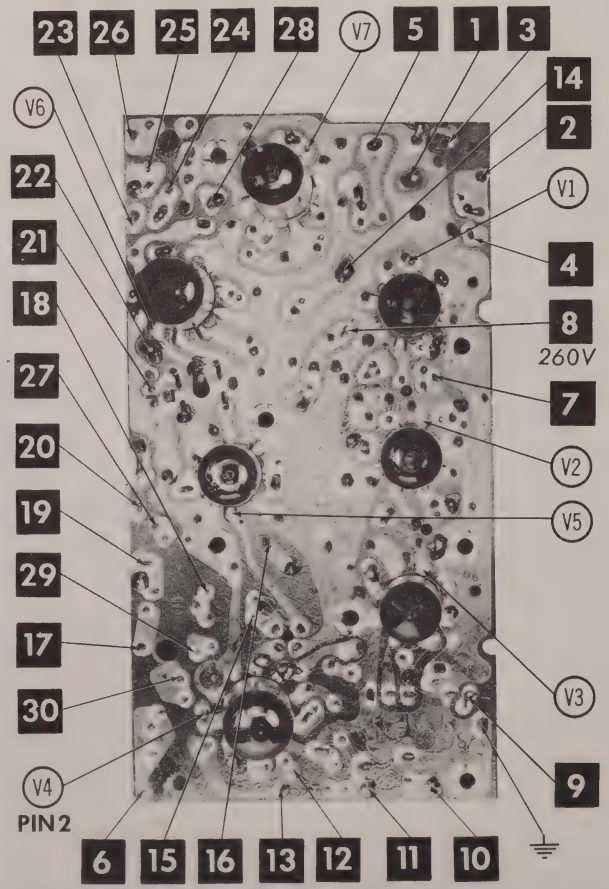
LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, Diode (Video Det.), V4
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V14
Has pic, no sound V5, V6, V7

SYNC FAILURE
No vert. sync V4
No horiz. sync V4
No vert. or horiz. sync V4



MAIN PRINTED BOARD - ALIGN. & INDUCTOR IDENT.

CircuiTrace Numbers 1 thru 30



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ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

MAIN PRINTED BOARD

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Turn Volume control fully counterclockwise and Contrast fully clockwise.
Connect the negative lead of a 4 volt bias supply to point Ⓐ. Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Fig. 1	Connect thru network (Fig. 1) to Tuner Test Jack located on top of tuner.	Not used	45.75MC (Unmod)	Any non-interfering channel	USE VTVM DC probe thru 22K to point Ⓑ. Common to chassis. (Across Video Det. load)	Mixer Plate Coil	Adjust for maximum deflection.
2.	"	"	"	42.5MC	"	"	A1	"
3.	"	"	"	42.8MC	"	"	A2	"
4.	"	"	"	45.2MC	"	"	A3	"
5.	"	"	"	44.15MC	"	"	A4	"
6.	"	"	"	47.25MC	"	"	A5	Adjust for MINIMUM deflection.
7.	"	"	44MC (10MC Swp)	41.25MC 42.5MC 44.15MC 45.0MC 45.75MC 47.25MC	"	"		Check for response similar to Fig. 2 with markers as shown. If necessary, retouch proper slug (s) to obtain desired response. High frequency side of curve is controlled by Mixer Plate Coil and A3. Low frequency side is controlled by A1 and A2. Adjust A4 to control peak and shape of curve. If necessary, retouch A5 to correctly position 47.25 MC marker.

4.5MC TRAP ALIGNMENT

Connect the negative lead of a 7.5 volt bias supply to point Ⓐ. Positive to chassis.
Turn Volume control fully counterclockwise and Contrast fully clockwise.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	.001mfd	High side to point Ⓑ. Low side to chassis.	Not used	4.5MC (400∿ 30% AM Mod)	Any non-interfering channel	Vert. Amp. thru demodulator probe to pin 7 (cathode) of picture tube. Low side to chassis.	A6	Adjust for MINIMUM 400∿ indication on scope.

SOUND IF ALIGNMENT

Connect two matched 100K (±1%) resistors in series from point Ⓒ to chassis. The junction of these two resistors is alignment point Ⓓ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.001mfd	High side to point Ⓑ. Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to point Ⓒ. Common to chassis.	A7, A8	Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point Ⓔ. Common to point Ⓓ.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

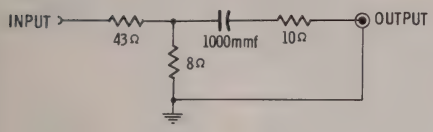


FIG. 1

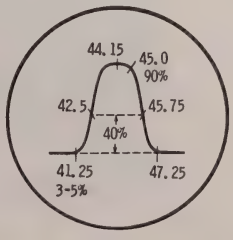
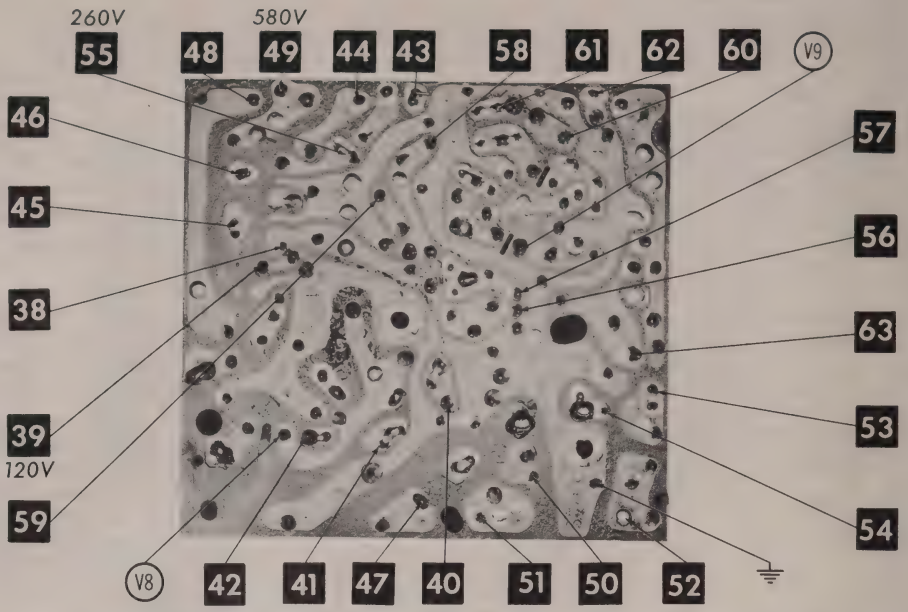


FIG. 2

CircuiTrace Numbers 38 thru 63



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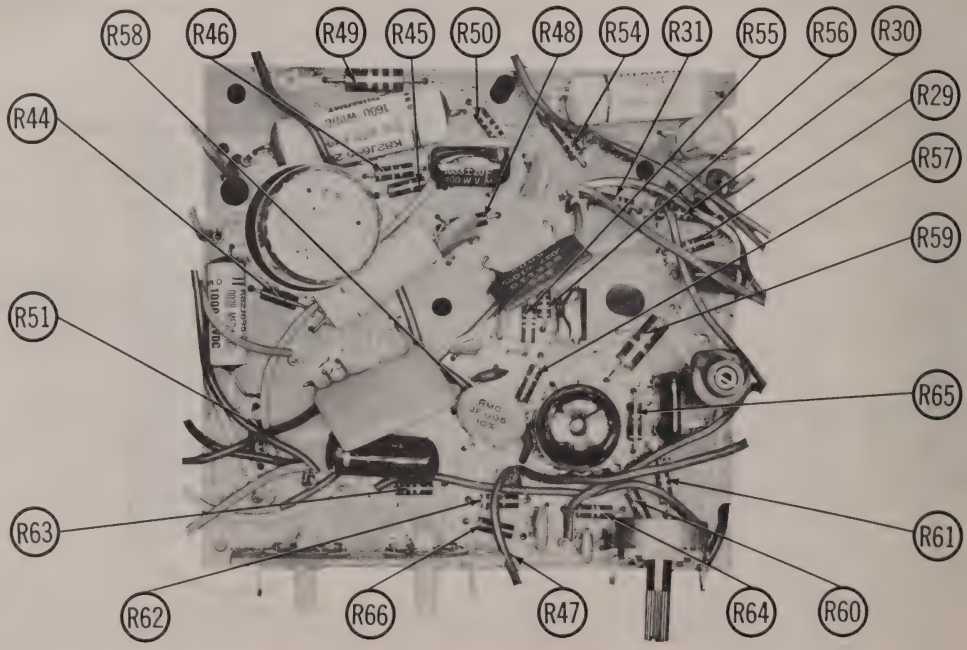
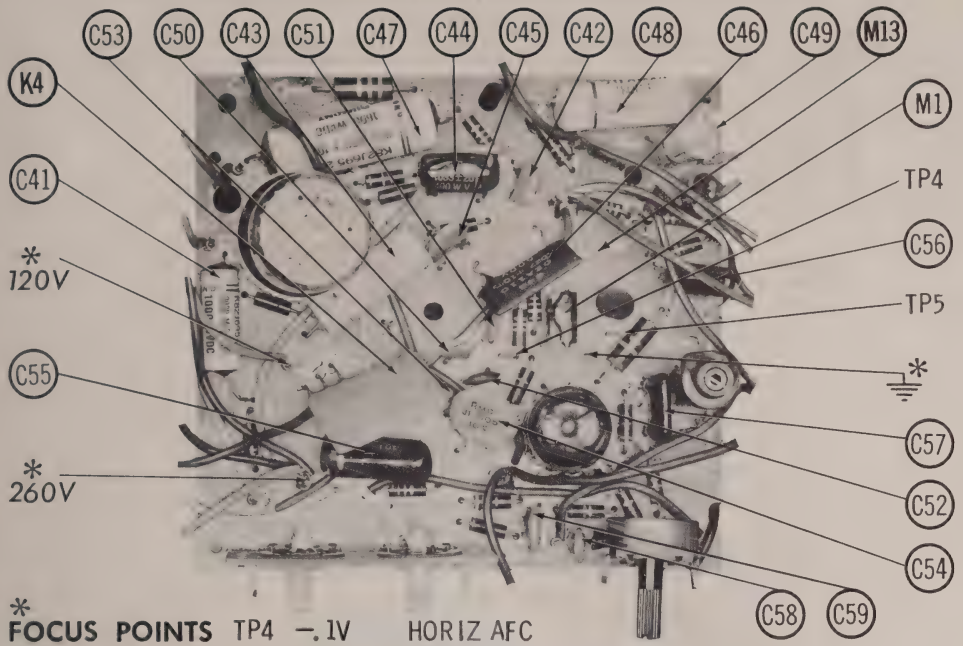
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

VERT., HORIZ. SWEEP PRINTED BOARD

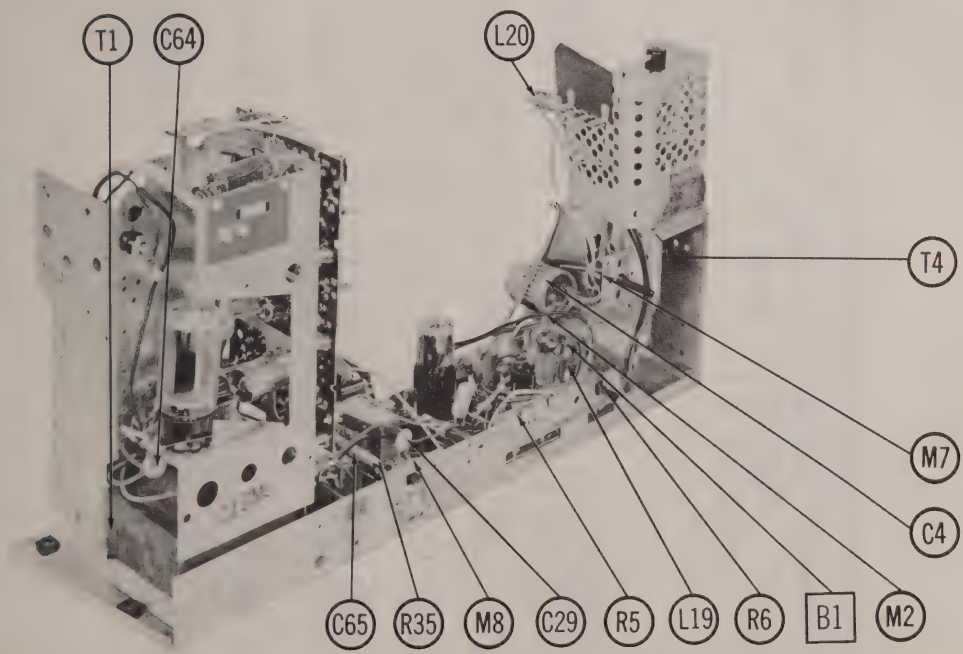


VERT., HORIZ. SWEEP PRINTED BOARD - RESISTOR IDENT.



FOCUS POINTS TP4 −.1V HORIZ AFC
TP5 260V HORIZ MULT PLATE

VERT., HORIZ. SWEEP PRINTED BOARD
CAPACITOR, MISC, TEST POINT, FOCUS POINT IDENT.



TV CHASSIS - REAR VIEW

TV PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	1st Video IF Amp.	6BZ6	V8	Vert. Mult. - Vert. Output	6DN7
V2	2nd Video IF Amp.	6BZ6	V9	Horiz. Mult.	6CG7
V3	3rd Video IF Amp.	6CB6 (6CB6A) *	V10	Horiz. Output	6DQ6B
V4	Video Output - Sync. Sep.	6CX8	V11	Damper	6AX4GTB
V5	Sound IF Amp.	6AU6A	V12	HV Rectifier	1J3
V6	Ratio Det. - AF Amp.	6FM8	V13	LV Rectifier	5U4GB
V7	Audio Output	6CU5			

* Alternate

PICTURE TUBE

ITEM No.	REPLACEMENT DATA					NOTES
	G. E. PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
V14	23KP4 21ESP4 17DLP4	23KP4 ① 21ESP4 ① 17DLP4 ①				① Aluminized

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	G. E. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	▲60	350	W31X165	AFH4-97-95		FP330, 28 TC2501		TVLS-4607.9 *	
B	■100	350							
C	▲100	150							
D	100	10							
C2	100	150	W31X129	AFH1-21	XA0241	FP116	TMS-1240	TVL-1423	
C3	4	50	W31X177	PRS1400	BBR4-50	TT50X4	TD-4-50	TE-1302.1	
C4	40	400	W31X170	PRS1750	BR4045	TC78	TD-40-450	TVA-1712	
C5	4	10NP	Note 1	PRS7405	BBR4-150	TCN504		TVANS-1202.2 *	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
Note 1. Some versions may use 4mfd @ 25V non-polarized Part #WT31X161 in this application.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	EMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C6	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C7	22 NPO 5%			DTZ-22	C10Q22C		CNO-422	10TCC-Q22
C8	800		BPD-0008	DD-801	L10T8	CCD-801	B-382	10TS-T80
C9	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C10	800		BPD-0008	DD-801	L10T8	CCD-801	B-382	10TS-T80
C11	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C12	800		BPD-0008	DD-801	L10T8	CCD-801	B-382	10TS-T80
C13	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C14	800		BPD-0008	DD-801	L10T8	CCD-801	B-382	10TS-T80
C15	300 10%		DI-300	DD-301	L10T3	CCD-301	GP330	10TS-T30
C16	800		BPD-0008	DD-801	L10T8	CCD-801	B-382	10TS-T80
C17	800		BPD-0008	DD-801	L10T8	CCD-801	B-382	10TS-T80
C18	1000 10%		DI-1000	DD-102	5R5D1	CCD-102	GP210	10TS-D10
C19	1200		DI-1200	DD-122	L10D12	CCD-122	B-212	10TS-D12
C20	800		BPD-0008	DD-801	L10T8	CCD-801	B-382	10TS-T80
C21	2 10%		NPO-SI 2.0	TCZ-2R2	C10V2C	CCTO-2R2	CNO-522	10TCC-V22
C22	4.7 10%		NPO-SI 4.7	TCZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-Y47
C23	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C24	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C25	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C26	33 NPO		NPO-DI 33	DTZ-33	C10Q33C	CCTO-330	CNO-433	10TCC-Q33
C27	33	Note 1	SI 33	D6-330	L10Q33	CCD-330	GP433	10TS-Q33
C28	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C29	10000	Note 2	BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C30	3300		BPD-0033	DD-332	BYA10D33	CCD-332	B-332	5HK-D33
C31	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C32	.002 200V	Note 1	P288N-002	D6-202	CUB6D2	6DP-1-202	GEM-622	6TM-D20
C33	47 N750	Note 1	N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C34	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C35	.033 400V	Note 2	P488N-033	DD-303	CUB6S33	4DP-2-333	GEM-4133	4TM-S33
C36	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S10
C37	10000	Note 1	BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C38	800		BPD-0008	DD-801	L10T8	CCD-801	B-382	10TS-T80
C39	800		BPD-0008	DD-801	L10T8	CCD-801	B-382	10TS-T80
C40	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C41	.0039 1000V 10%		P1084CM-0039		DPMSI6D4	16DP-2-402	JL-239	
C42	800		BPD-0008	DD-801	L10T8	CCD-801	B-382	10TS-T80
C43	.022 600V 10%		V84C6S22-10%		PM6S22	6DP-2-223	GEM-1612	6TM-S22
C44	.033 400V		P488N-033	DD-303	CUB6S33	4DP-2-333	GEM-4133	6TM-S33
C45	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C46	.027 500V 10%		P684CM-027		DPMS6S27	6DP-3-273		5BF-S27
C47	.018 1600V 10%				DPMSI6S2	16DP-4-203	GEM-1612	
C48	.015 1000V		P1088N-015	DD16-153	CUB10S15	16DP-4-153	GEM-10115	10TM-S15
C49	.01 600V 10%		V84C6SI-10%		PM6S1	6DP-2-103	GEM-1611	6TM-S10
C50	39 N750 10%			TCN-39	C10Q39U	CCTN-390	CN7-439	10TCU-Q39
C51	68 N750 10%		N750-DI 68	DTN-68	C10Q68U	CCTN-680	CN7-468	10TCU-Q68
C52	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C53	680 10%		DI-680	DD-681	5R5T68	CCD-681	GP368	10TS-T68
C54	5000 10%		DI-5000		PM6D5	CCD-502	B-250	5HK-D50
C55	.12 200V 10%	Pt. #WT25X34						
C56	.0068 400V 10%		V84C4D68-10%		PM6D68	6DP-1-682	GEM-16268	6TM-D68
C57	820 5%		1469-00082		22R5T82	CM-19B-82LJ	MCE251	M8-382
C58	820 10%		DI-820	DD-821	5R5T82	CCD-821	GP382	10TS-T80
C59	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C60	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C61	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C62	300 4000V N1600 10%	Pt. #WT18X413						
C63	.056 600V 10%		P684CM-057		DPMS6S56	6DP-3-563		6PS-S56
C64	1000 2000V		HVD-30-1000	DD30-102	HVB20D1	3CCD-102	2HV-210	20GA-D1

TV PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C65	.01 600V		P688N-01	D6-103	CUB6S1	6DP-2-103	GEM-611	6TM-S10

Note 1. Not used in 17" Models.

Note 2. May not be used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES	
	RESISTANCE	WATTS	G. E. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.		
R1A	2meg 1meg Tap		WT49X310	APL-82		B18-139X	PP26T16	Volume	Note 1
B	Shaft			AK-8		SK8	DS-37		
C	Switch			Not Req.		Not Req.	Not Req.	Push-Pull Off-On	
R2A	1.5meg		WT49X309	AB-742	A47-1.5meg-S	B11-138	U155	Vert. Hold	Note 2
B	Shaft			AK-8	RS-3/16	SK9	DS-37		
R3A	500K		WT49X311	AB-613	A47-500K-S	B17-133	U50	Tone	Note 3
B	Shaft			AK-8	RS-3/16	SK9	DS-37		
R4A	200K		WT49X312					Brightness	Note 4
B	25K *							Contrast	Note 4
R5A	4meg		WT49X274	TT-86	B47-5meg-S	HLC4	PTA56L	Vert. Linearity	
B	500K			TT-59	B47-500K-S	B11-133	PTA55L	Height	
C	Shaft			Not Req.	Not Req.	TM4	Not Req.		
R6A	1meg		WT49X273	TT-69	B47-1meg-S	B11-137	PTA1254L	Horiz. Hold	
B	Shaft			Not Req.	Not Req.	TM4	Not Req.		

Note 1. 17" Models use Part #WT49X308.
Note 2. 17" Models use Part #WT49X307.
Models 782 & 783 use Part #WT49X325.
* 3000Ω Stop, 16.5K Tap.

Note 3. Not used in some versions.
Note 4. 17" Models use Part #WT49X306.
Models 782 & 783 use separate 200K brightness (Part #WT49X323) and contrast (Part #WT49X324).

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R7	15meg	
R8	120K	
R9	1.5meg	
R10	5600Ω	
R11	330K	
R12	220Ω	
R13	470Ω	
R14	47Ω	
R15	68K	
R16	220Ω	
R17	22Ω	
R18	220Ω	
R19	150Ω	
R20	56K	
R21	330K	
R22	6800Ω	
R23	3300Ω	
R24	1meg	
R25	5100Ω 7W	IRC #PW10-5100Ω
R26	22K	
R27	220K	
R28	12K	
R29	47K	

ITEM No.	RATING	REMARKS
R30	3.3meg	
R31	680K	
R32	1meg	
R33	10K 1W	
R34	270Ω	
R35	22Ω	
R36	22Ω	
R37	100Ω	
R38	220K	Note 1
R39	10meg	
R40	680K	
R41	470K	
R42	470K	
R43	680Ω 2W	
R44	1.5meg	
R45	1meg	
R46	820K	
R47	150K	
R48	15K	
R49	56K 1W	
R50	68K	
R51	47K	
R52	1000Ω	

ITEM No.	RATING	REMARKS
R53	1000Ω	
R54	15K	
R55	560K	
R56	390K	
R57	1.5meg	
R58	56K	
R59	15K 1W	
R60	1meg	
R61	62K	
R62	43K	
R63	33K	
R64	12K	
R65	820Ω	
R66	1meg	
R67	470Ω	
R68	100Ω	
R69	13K 2W	
R70	2200Ω	
R71	2.2meg	
R72	82Ω	
R73	4700Ω 2W	
R74	22Ω	
R75	1000Ω	

Note 1. Not used in 17" Models.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	G. E. PART No.	REPLACEMENT DATA
K1	Ratio Det. Cath. Comp.	800mmf, 22K	WT24X5	Centralab RC-476 Sprague PRC-4
K2	Audio Coupling	1300mmf, 2000mmf, 10000mmf, 47K	WT33X30	
K3	Sync Sep. Grid	470mmf, 470K	WT24X3	Centralab RC-465 Sprague PRC-3
K4	Vert. Integrator	150mmf, 800mmf, 3300mmf, 22K, 68K, 68K, 100K	WT33X29	Centralab PC-350

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		G. E. PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	
L1	47.25MC Trap	WT36X379				① Includes 100Ω Resistor & 120mmf Capacitor.
L2	RF Choke	WT36X377				
L3	1st Video IF	WT36X378				
L4	2nd Video IF	WT61X106				
L5	3rd Video IF	WT61X107				
L6	4th Video IF	WT36X382				
L7	RF Choke (1uh)	WT36X381	BC-561	4602	RTC-8515	
L8	RF Choke (.22uh)	WT36X386		4584	RTC-8512	
L9	RF Choke (7uh)	WT36X427	BC-565	4610	RTC-8520	
L10	RF Choke (10uh)	WT36X401	BC-566	4612	RTC-8522	
L11	RF Choke (7.8uh)	WT36X344	BC-565	4611	RTC-8521	
L12	Peaking (120uh)	WT36X410	TV-195	6153	RTC-8585	
L13	Peaking (390uh)	WT36X264	TV-201	6134	RTC-8578	
L14A	4.5MC Trap	WT36X405				
B	Sound Takeoff					
L15	Peaking (680uh)	WT36X261	TV-206	6148	RTC-8583	
L16	Peaking (240uh)	WT36X425	TV-185	6181	RTC-8598	
L17	Ratio Detector	WT56X48 ①				
L18	RF Choke (10uh)	WT36X105	BC-566	4612	RTC-8522	

TV PARTS LIST AND DESCRIPTIONS (Continued)

COILS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA G E PART No.	Merit PART No.	Miller PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L19	Horiz. Stabilizer	WT36X349						
L20	Width Choke	WT38X409					HS-16	

FILTER CHOKE

ITEM No.	RATINGS CURRENT (Measured)	RATINGS DC RES.	RATINGS INDUCTANCE @ CURRENT (000 "A")	REPLACEMENT DATA G E PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
L21	220A	70Ω	1.2 Hy	WT63X56		C-2343			

TRANSFORMER (POWER)

ITEM No.	RATING PRI	RATING SEC 1	RATING SEC 2	REPLACEMENT DATA G E PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	117V @ 1.5A	500VCT @ 220A DC	5V @ 2A	WT86X68 ①				R-75BA	① Alternate Pt. #WT86X41. Models M782 & M783 use Pt. #WT63X35 in this application.
	SEC 3	SEC 4	SEC 5						
	6.3V @ 5.5A								

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA G E PART No.	Merit PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T3	Vert. Output	WT64X69 ①	A-3037		VO-101 ②	26S75 ②	A-138X	
T3	Yoke (Horiz. Deflection) (10PP) (Vert. 3A 34Ω)	WT76X31 ②			DY-40A	Y-51 ②	Y-70-1 ②	
T4	Horiz. Output	WT07X46						

① Drill new mounting holes.
Connect as autoformer and use 15 to 1 Turns Ratio
Use original vert. yoke biasing resistors if necessary
Connect yoke terminal #2 to horizontal output transformer terminal #1; remove blue lead from terminal #7 and connect CS3 (.056 capacitor) from terminal #7 to terminal #5 of width switch.
Includes magnets, centering device and yoke clamp.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI	IMPEDANCE SEC	REPLACEMENT DATA G E PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T5	2900Ω	3-4Ω	WT64X80 ①	A-3015	A-3849	26S50	S-67X	① Used in 21" and 23" Models. 17" Models use Pt. #WT64X79.

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C.	TYPE IMP.	REPLACEMENT DATA G. E. PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	8"	PM	3-4Ω		WT63X7 ①	8A3S	① Used in Models M631VMD, VOA, M633VMD, VOA.
SP2	4"	PM	3-4Ω		WT63X28 ②	4AUT2S	② Used in Models M734VMD, VOA, VWD, M737VMD, VOA, VWD, M740VMD, VMP, VOA, M741VMD, VMP, R633VMD, VOA, M736VMD, VMD, VWD, R741VMD.
	4"	PM	3-4Ω		WT63X8 ③	4AUT2S	
	4 x 6	PM	3-4Ω		WT63X22 ④	4SA07	③ Used in Models M740VMD, VMP, VOA, M741VMD, VMP, M750VMD, VMP, VWD, M751VMD, VWD, R740VCD, VMD, VWD, R741VMD, R750VCD, VMD, VWD.
	6 x 9	PM	3-4Ω		WT63X29 ⑤		④ Used in Models M630VDZ, VEB, VMD, VOA, M421VEB, VMD, M424VMD, M430VBN, R420VMD, M431VBN.
							⑤ Used in Models M304VGR, M305GR, M306VWD, M307VWD, M308VBG, M310VEB, VVY, M311VVY, M316VWD, M736VOA, M736VWD, M737VWD, M738VWD, VVY, M739VOA, VWD, R738VMD, VMP, VWD.
							⑥ Used in Models M426VGL, VWD, M427VWD, M738VMD, VOA, VWD, M739VOA, VWD, R738VMD, VMP, VWD.
							⑦ Used in Models M750VMD, VMP, VWD, M751VMD, VWD, R750VCD, VMD, VWD.

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA G E PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1		WT63X7 *	6GC1 *				* Dual Selenium (Common Cathode Type)

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA G E PART No. FUSE	HOLDER	LITTELFUSE PART No. FUSE	HOLDER	BUSS PART No. FUSE	HOLDER
M3	3AG	3.5A 250V.	WT10X11		315 .375		MDV3/8	
		3.5A 3AG 250V. 3AG			3AG 3.5A 250V 3AG			
M3	C	3.5A 250V.	WT10X30	WT8X61	313003.5	346007	C 3½	HC 3½ to 3½
M4	2½"	length	#26 wire					

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA G E PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
X5	1N34	WT63X5	1N64	1N64	Video Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	G E PART No.	NOTES
M6	Tuner	WT86X96	VHF
	Tuner	WT86X97	VHF with UHF Provisions
	Tuner	WT86X98	VHF
	Tuner	WT86X38	UHF
M7	Switch	WT39X5	Width
M8	Switch	WT73X6	TV-Phase (DPDT Slide Type)
M9	Magnet	1-WT42X31	Ion Trap
M10	Magnet	WT50X1	Anti-Fluctuation (Kit of 2)
M11	Motor	WT75X31	Power GE-QA (Actuated by Program Wheel)
M12	Motor	WT72X9	Power Tuning Assembly, Complete
	Motor	WT72X10	Power Tuning Assy., Complete (Interchangeable with WT72X9)
	Switch	WT55X30	Used with Power Tuning Assembly Part #WT72X9
	Switch	WT55X34	Used with Power Tuning Assembly Part WT72X10
M13	Spark Gap	WT10X37	
	Printed Board	WT93X37	Plug-In Unit for Video Detector Assembly

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO	DESCRIPTION
Glass	WT94X77	Safety, Tinted Glass, Model M420VBZ, M420VEB, M420VMD, M430VOA, M431VEB, M432VMD, M434VMD, M435VMD, M432VOA, M433VML, M433VOA, R432VMD, R432VOA
Glass	WT94X79	Safety, Clear Glass, Model M430VBN, M431VBN
Glass	WT94X81	Safety, Tinted Plastic, Model M428VGL, M426VWD, M427VWD
Glass	WT94X83	Safety, Tinted Plastic, Model M304VGR, M305VGR, M306VWD, M307VWD, M308VBG, M310VEB, M310VVY, M311VVY, R306WD, R310VVY
Glass	WT94X84	Safety, Tinted Glass, Model M734VMD, M734VWD, M736VMD, M736VOA, M736VWD, M737VMD, M737VWD, M738VMD, M738VOA, M738VWD, M739VOA, M739VWD, R738VMD, R738VMP, R738VWD
Glass	WT94X85	Safety, Tinted Glass, Model M740VMD, M740VOA, M741VMD, M741VMP, M750VMD, M750VMP, M750VWD, M751VMD, M751VWD, R740VCD, R740VMD, R740VWD, M743VMD, M743VOA, M744VMD, M744VOA, R743VMD, R743VOA
Glass	WT94X86	Safety, Tinted Glass, Model R430VMD, R432VOA
Mask	WT96X55	Matte White, with Clips, Model M430VBN, M431VBN, M432VMD, M432VOA, M433VMD, M433VOA
Mask	WT96X52	Off White & Gold, with Clips, Model M420VBZ, M420VEB, M420VMD, M430VOA, M421VEB, M421VMD, M434VMD, R420VMD
Mask	WT96X56	Matte White, with Clips, Model R433VMD, R432VOA
Mask	WT96X57	Off White & Gray Green, with Clips, Model M734VMD, M734VWD, M738VMD, M738VOA, M738VWD, M737VMD, M737VWD, M738VMD, M738VOA, M738VWD, M739VOA, M739VWD, R738VMD, R738VMP, R738VWD, R750VCD, R750VMD, R750VWD
Mask	WT96X59	Gray & White, Model M740VMD, M740VMP, M740VOA, M741VMD, M741VMP, M750VMD, M750VMP, M750VWD, M751VMD, M751VWD, R740VCD, R740VMD, R741VMD, M743VMD, M743VOA, M744VMD, M744VOA, R743VMD, R743VOA
Knob	WT43X311	VHF Channel Selector, Black, Model M304VGR, M305VGR, M308VWD, M307VWD, M309VBG, M310VEB, M310VVY, M311VVY
Knob	WT43X315	VHF Channel Selector, Clear with Gold Insert, Model M420VBZ, M420VEB, M420VMD, M420VOA, M421VEB, M421VMD, M424VMD, M426VGL, M426VWD, M427VWD, M734VMD, M734VWD, M736VMD, M738VOA, M736VWD, M737VMD, M737VWD
Knob	WT43X322	VEF Channel Selector, Black & Gold, Model M782VMD, M782VWD, M783VWD
Knob	WT43X325	VHF Fine Tuning, Clear & Gold, Model M782VMD, M782VWD, M783VWD
Knob	WT43X315	VHF Channel Selector, Clear with Gold Insert, Model M430VBN, M431VBN, M432VMD, M432VOA, M433VMD, M433VOA, R306VWD, R310VVY, R420VMD, R431VMD, R432VOA, R738VMD, R738VMP, R738VWD, R740VCD, R740VMD, R741VMD, R750VCD, R750VMD, R750VWD
Knob	WT43X320	VHF Channel Selector, Gold & Black, Model M734VMD, M734VWD, M736VMD, M736VOA, M739VWD, M740VMD, M740VMP, M740VOA, M741VMD, M741VMP, M750VMD, M750VMP, M750VWD, M751VMD, M751VWD, R740VCD, R740VMD, R741VMD, R750VCD, R750VMD, R750VWD
Knob	WT43X289	UHF Channel Selector, Clear, Model M304VGR, M305VGR, M306VWD, M307VWD, M308VBG, M310VEB, M310VVY, M311VVY, M738VMD, M738VWD, M738VOA, M739VWD, M740VMD, M740VMP, M740VOA, M741VMD, M741VMP, M750VMD, M750VMP, M750VWD, M751VMD, M751VWD, R740VCD, R740VMD, R741VMD, R750VCD, R750VMD, R750VWD
Knob	WT43X286	UHF Indicator, Black, Model M305VGR, M307VWD, M311VVY, M421VEB, M421VMD, M427VWD, M431VBN, M433VMD, M433VOA, M737VMD, M737VWD, M739VOA, M741VMD, M751VMD, M751VWD, M424VMD, M426VGL, M426VWD, M427VWD, M734VMD, M734VWD, M736VMD, M736VOA, M737VMD, M737VWD, R738VMD, R738VMP, R738VWD, R740VCD, R740VMD, R741VMD, R750VCD, R750VMD, R750VWD
Knob	WT43X300	Fine Tuning, Clear, Model M420VBZ, M420VEB, M420VMD, M430VOA, M421VEB, M421VMD, M424VMD, M426VGL, M426VWD, M427VWD, M430VBN, M431VBN, M432VMD, M432VOA, M433VMD, M433VOA, M734VMD, M734VWD, M736VMD, M736VOA, M736VWD, M737VMD, M737VWD
Knob	WT43X312	Fine Tuning, Clear, Model M304VGR, M305VGR, M306VWD, M307VWD, M308VBG, M310VEB, M310VVY, M311VVY, M738VMD, M738VWD, M738VOA, M739VWD, M739VOA
Knob	WT43X317	Fine Tuning, Gold, Model M740VMD, M740VMP, M740VOA, M741VMD, M741VMP, M750VMD, M750VMP, M750VWD, M751VMD, M751VWD, R305VWD, R310VVY, R420VMD, R431VMD, R432VOA, R738VMD, R738VMP, R738VWD, R740VCD, R740VMD, R740VWD, R741VMD, R750VCD, R750VMD, R750VWD
Knob	WT43X297	Brightness, Clear
Knob	WT43X321	Tone, Gold, Model M740VMD, M740VMP, M740VOA, M741VMD, M741VMP, M750VMD, M750VMP, M750VWD, M751VMD, M751VWD, R740VCD, R740VMD, R740VWD, R741VMD, R750VCD, R750VMD, R750VWD
Knob	WT43X313	Contrast, Black with Gold Insert, Model M304VGR, M305VGR, M306VWD, M307VWD, M308VBG, M310VEB, M310VVY, M311VVY, M420VBZ, M420VEB, M420VMD, M420VOA, M421VEB, M424VMD, M426VGL, M426VWD, M427VWD, M430VBN, M431VBN, M432VMD, M432VOA, M433VMD, M433VOA, M734VMD, M734VWD, M736VMD, M736VOA, M736VWD, M737VMD, M737VWD
Knob	WT43X318	Contrast, Gold, Model M734VMD, M734VWD, M736VMD, M736VOA, M736VWD, M737VMD, M737VWD, M738VMD, M738VOA, M738VWD, M739VOA, M739VWD, M740VMD, M740VMP, M740VOA, M741VMD, M741VMP, M750VMD, M750VMP, M750VWD, M751VMD, M751VWD, R420VMD, R432VMD, R432VOA, R738VMD, R738VMP, R738VWD, R740VCD, R740VMD, R740VWD, R741VMD, R750VCD, R750VMD, R750VWD
Knob	WT43X316	Off-On, Volume, Vertical Hold, Gold, Model M734VMD, M734VWD, M736VMD, M736VOA, M736VWD, M737VMD, M737VWD, M738VMD, M738VOA, M738VWD, M739VOA, M739VWD, M740VMD, M740VMP, M740VOA, M741VMD, M741VMP, M750VMD, M750VMP, M750VWD, M751VMD, M751VWD, R420VMD, R432VMD, R432VOA, R738VMD, R738VMP, R738VWD, R740VCD, R740VMD, R740VWD, R741VMD, R750VCD, R750VMD, R750VWD
Knob	WT43X324	FM Tuning, Brown and Gold, Model M782VMD, M782VWD, M783VWD
Knob	WT43X323	AM Tuning, Brown and Gold, Models M782VMD, M782VWD, M783VWD
Knob	WT43X328	AM, FM Function Selector, Brown & Gold, Model M782VMD, M782VWD, M783VWD
Knob	WT43X326	Contrast, Brightness, Vertical Hold, Gold, Model M782VMD, M782VWD, M783VWD
Knob	WT43X327	Loudness, Bass, Treble, Balance, Selector Model M782VMD, M782VWD, M783VWD

CABINETS & CABINET PARTS (cont)

NAME	PART NO.	DESCRIPTION
Cabinet	WT103X283	Plastic, Gray, Model M304VGR, M305VGR
Cabinet	WT103X284	Plastic, Walnut, White & Gold, Model M306VWD, M307VWD, R306VWD
Cabinet	WT103X286	Plastic, Rose & Beige, Model M308VBG
Cabinet	WT103X286	Plastic, Gold, Model M310VVY, M311VVY, R310VVY
Cabinet	WT103X287	Plastic, Gold & Black, Model M310VEB
Cabinet	WT103X289	Metal, Black Vinyl Covered, Model M430VEB, M421VEB
Cabinet	WT103X290	Metal, Bronze Vinyl Covered, Model M420VBZ
Cabinet	WT103X291	Metal, Mahogany, Model M420VMD, M422VMD, R420VMD
Cabinet	WT103X292	Metal, Oak, Model M420VOA
Cabinet	WT103X293	Masonite, Mahogany, Model M434VMD
Cabinet	WT103X295	Masonite, Brown, Model M430VBN, M431VBN
Cabinet	WT103X296	Masonite, Mahogany, Model M433VMD, M433VMD, R433VMD
Cabinet	WT103X297	Masonite, Oak, Model M433VOA, M433VOA, R433VOA
Cabinet	WT103X301	Masonite, Dark Mahogany, Model M736VMD, M737VMD
Cabinet	WT103X303	Masonite, Oak, Model M736VOA
Cabinet	WT103X304	Masonite, Dark Mahogany, Model M734VMD
Cabinet	WT103X305	Masonite, Dark Walnut, Model M734VWD
Cabinet	WT103X306	Masonite, Dark Walnut, Model M736VWD, M737VWD
Cabinet	WT103X307	Masonite, Mahogany, Model M738VMD, R738VMD
Cabinet	WT103X308	Masonite, Walnut, Model M738VWD, M739VWD, R738VWD
Cabinet	WT103X309	Masonite, Oak, Model M738VOA, M739VOA
Cabinet	WT103X310	Masonite, Mahogany, Model R740VMD, R741VMD
Cabinet	WT103X311	Masonite, Walnut, Model R740VWD
Cabinet	WT103X312	Masonite, Cherry, Model R740VOD
Cabinet	WT103X313	Masonite, Mahogany, Model M740VMD, M741VMD
Cabinet	WT103X314	Masonite, Maple, Model M740VMP, M741VMP
Cabinet	WT103X316	Metal, Walnut, Model M426VWD, M427VWD
Cabinet	WT103X317	Metal, Columbia Gold, Model M426VGL
Cabinet	WT103X320	Masonite, Mahogany, Model M750VMD
Cabinet	WT103X321	Masonite, Walnut, Model M750VWD, M751VWD
Cabinet	WT103X322	Masonite, Oak, Model M750VOA
Cabinet	WT103X323	Masonite, Cherry, Model R750VOD
Cabinet	WT103X324	Wood, Mahogany, Model R750VMD
Cabinet	WT103X325	Wood, Walnut, Model R750VWD
Cabinet	WT103X326	Wood, Cherry, Model R750VCD
Cabinet	WT103X327	Masonite, White Oak, Model M740VOA
Cabinet	WT103X329	Masonite, Maple, Lo-Boy, Model M738VMP
Cabinet	WT103X345	Wood, Mahogany, Model M782VMD
Cabinet	WT103X346	Wood, Walnut, Model M782VWD, M783VWD
Leg	WT78X84	Plastic, Mahogany, Model M430VBN, M431VBN, M433VMD, M440 M433VMD, R432VMD,
Leg	WT78X85	Plastic, Oak, Model M432VOA, M433VOA, M740VOA, R432VOA
Leg	WT78X76	Plastic, Mahogany, Model M735VMD, R738VMD
Leg	WT78X78	Plastic, Oak, Model M738VOA, M739VOA
Leg	WT78X94	Plastic, Walnut, Model M736VWD, M739VWD, R738VWD
Leg	WT78X96	Wood, Mahogany, Rear, Model M736VMD
Leg	WT78X96	Wood, Mahogany, Front, Model M734VMD
Leg	WT78X97	Wood, Walnut, Rear, M734VWD, R750VWD
Leg	WT78X99	Wood, Maple, Model M740VMP, M741VMP
Leg	WT78X100	Wood, Mahogany, Right Front & Rear, Model M750VMD, M751VMD
Leg	WT78X101	Wood, Mahogany, Left Front & Rear, Model M750VMD, M751VMD
Leg	WT78X102	Wood, Walnut, Right Front & Rear, Model M750VWD, M751VWD, R306VWD
Leg	WT78X103	Wood, Walnut, Left Front & Rear, Model M750VWD, M751VWD, R306VWD
Leg	WT78X104	Wood, Maple, Rear, Model M750VMP
Leg	WT78X105	Wood, Maple, Front, Model M750VMP
Leg	WT78X106	Wood, Maple, Model R738VMP
Leg	WT78X107	Wood, Walnut, Front, Model R750VWD
Leg	WT78X108	Wood, Cherry, Front, Model R750VCD
Leg	WT78X109	Wood, Cherry, Rear, Model R750VCD
Handle	WT78X71	Carrying, Black & Chrome, Model M310VEB
Handle	WT78X72	Carrying, Ivory & Rich Lo-Brass, Model M310VVY, M311VVY, R306VWD, R310VVY
Handle	WT78X81	Carrying, Gold, Model M426VGL, M426VWD, M427VWD
Handle	WT78X86	Carrying, Gold, Model M305VGR
Handle	WT4X78	Drawer Pull, Brite Brass, Model M750VMD, M751VMD
Handle	WT4X79	Drawer Pull, Brite Brass, Model R750VMD
Handle	WT4X80	Drawer Pull, Brite Brass, Model R750VWD
Glass	WT6X10	Dial, Radio, Model M781VMD, M782VWD, M783VWD
Pointer	WT6X8	AM, Orange, Model M782VMD, M782VWD, M783VWD
Pointer	WT6X9	FM, Orange, Model M782VMD, M782VWD, M783VWD

WIRING DATA

High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8534 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-In	Use BELDEN No. 8230 or 8276
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

REMOTE CONTROL RECEIVER PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	* GENERAL ELECTRIC * USE	TYPE	ITEM No.	* RAYTHEON * USE	TYPE	ITEM No.	* SYLVANIA * USE	TYPE
V15	RF Amp.	6GH8	V17	Channel Sel. Relay Control-	6GH8			
V16	Limiter	6GH8		Audio Level Relay Control				

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA G. E. PART No.	ARROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C68A ①	ø 80	150	WT81X119	AFH2-15	BH180	FP83	TMD-R15	FP87.5	
	ø 20	150							

REMOTE CONTROL RECEIVER PARTS LIST (Continued)

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C67	1500 10%		1469-0015		5R5D15	CM-19B-152K	MCB456	MS-215
C68	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C69	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C70	100		BPD-0001	DD-101	L10T1	CCD-101	GP310	10TS-T10
C71	220		DI-220	DD-221	L10T22	CCD-221	B-322	10TS-T22
C72	150		BPD-00015	DD-151	L10T15	CCD-151	B-315	10TS-T15
C73	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S10
C74	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C75	18 10%		DI-18	DD-180	L10Q18	CCD-180	GP418	10TS-Q18
C76	1000 10%		1469-001		5R5D1	CM-19B-102K	MCB255	MS-21
C77	1500		BPD-0015	DD-152	BYA10D15	CCD-152	B-215	5HK-D15
C78	.1 600V		P688N-1	DF-104	CUB6P1	6DP-4-104	GEM-601	6TM-P10
C79	.1 600V		P688N-1	DF-104	CUB6P1	6DP-4-104	GEM-601	6TM-P10
C80	18 10%		DI-18	DD-180	L10Q18	CCD-180	GP418	10TS-Q18
C81	1000 10%		1469-001		5R5D1	CM-19B-102K	MCB255	MS-21
C82	1500		BPD-0015	DD-152	BYA10D15	CCD-152	B-215	5HK-D15
C83	.1 600V		P688N-1	DF-104	CUB6P1	6DP-4-104	GEM-601	6TM-P10
C84	.1 600V		P688N-1	DF-104	CUB6P1	6DP-4-104	GEM-601	6TM-P10
C85	.0047 600V		P688N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C86	.1 600V		P688N-1	DF-104	CUB6P1	6DP-4-104	GEM-601	6TM-P10

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	G. E. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R76	2000Ω	2(WW)	WT49X313		39-2000	112-2000	FL2K	Remote Receiver Sensitivity

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R77	100K	
R78	330K	
R79	560Ω	
R80	470K	
R81	100K	
R82	120K	
R83	15K	
R84	3.3meg	
R85	1.5meg	

ITEM No.	RATING	REMARKS
R86	470K	
R87	470K	
R88	22K	
R89	39K	
R90	1.5meg	
R91	4.7meg	
R92	1.5meg	
R93	4.7meg	
R94	3.9meg	

ITEM No.	RATING	REMARKS
R95	3.9meg	
R96	390K	
R97	180K	
R98	120K	
R99	4700Ω	
R100	3300Ω	
R101	680Ω	
R102	1.5Ω 1W	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		G. E. PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	
L22	Input	WT37X30				
L23	Detector	WT56X53				
L24	Detector	WT56X53				

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	G. E. PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T6	117V @ .1A	100VAC @ .080A DC	24V @ 3A Tap @ 6.3V @ 1.3A	WT88X47					

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	G. E. PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M14	.015A	WT57X23 *		1N1763 ‡	2F4 ‡	SR200 ‡	* Germanium Type
M15		WT16X9 ♦	6GD1 ♦				♦ Dual Selenium (Series Connected Type)
M16		WT16X8 †	6GX1 †				† Dual Selenium (Common Anode Type)
							‡ Silicon Type

MISCELLANEOUS

ITEM No.	PART NAME	G. E. PART No.	NOTES
M17	Relay	WT62X32	Sensitive (Channel Selector, Off-On)
M18	Relay	WT62X31	Stepping (Audio Level)
	Transducer	WT41X14	Resonant Freq. 40KC
	Remote Receiver Printed Board	WT62X30	Complete Sonic Remote Receiver assembly
		WT93X36	Includes Contact Spring Jumper Bars, Eyelet for Contact Spring

REMOTE CONTROL TRANSMITTER PARTS LIST

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N306	Osc.	2N649		2N306	NPN
X2	2N319	Amp.				PNP

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C87	.022 200V		V84C2S22		DPMS4S22	4DP-2-223	GEM-4122	2WF-S22
C88	.33 100V		V84 2P33		DPMS4P33	1DP-4-334	GEM-2033	2WF-P33
C89	1350 10%				5R5D13	CM-19B-132K		MS-213
C90	50-330	Pt. #WT30X55				465		
C91	240 10%		1469-00024	TCZ-240	22R5T4	CM-19B-241K	MCB240	MS-324

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R103	680Ω	
R104	330K	

ITEM No.	RATING	REMARKS
R105	47K	

ITEM No.	RATING	REMARKS
R106	15Ω	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		G. E. PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	
L25	Osc.	WT35X46				
L26	Output	WT36X426				

BATTERIES

ITEM No.	VOLTAGE	G. E. PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M19	9V	1-WT58X1				E146		TR-146R	

MISCELLANEOUS

ITEM No.	PART NAME	G. E. PART No.	NOTES
M20	Switch Assy.	WT55X29	Volume Off-On Channel Selector
	Transducer	WT41X15	Resonant Freq. 40KC ±½KC
	Transmitter Assy.	WT62X33	Sonic Remote Assembly Complete

VHF TUNER PARTS LIST AND DESCRIPTIONS

WT86X96

TUBES

◆ GENERAL ELECTRIC ◆			RAYTHEON ◆ SYLVANIA ◆		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V201	RF Amp.	6EV5	V202	Mixer - Osc.	6CL8A

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	15 NPO 10%		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C202	4 NPO ±.25mmf	Pt. #WT18X336			C10V4C			10TCC-V39
C203	1000		EF-001	MFT-1000		CCF-102	CT280A	
C204	1.2 5%		NPO-SI 1.0	TCZ-1			CNO-510	10TCC-V12
C205	1000		DI 1000	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C206	1000		EF-001	MFT-1000		CCF-102	CT280A	
C207	56 N750 5%			DTN-56	C10Q56U	CCTN-560	CN7-456	10TCU-Q56
C208	1.2 5%		NPO-SI 1.0	TCZ-1			CNO-510	10TCC-V12
C209	1.5 10%		NPO-SI 1.5	TCZ-1R5	C10V15C		CNO-515	10TCC-V15
C210	.33 10%	Pt. #WT21X18						
C211	.39 10%	Pt. #WT21X27						
C212	15 NPO 10%		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C213	1000		EF-001	MFT-1000		CCF-102	CT280A	
C214	1.2 5%	Note 1	NPO-SI 1.0	TCZ-1.0			CNO-510	10TCC-V12
C215	1.5 10%		NPO-SI 1.5	TCZ-1.5	C10V15C		CNO-515	10TCC-V15
C216	1000		DI-1000	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C217	1.5 P100-N750	Pt. #WT23X14						
C218	1000		EF-001	MFT-1000		CCF-102	CT280A	
C219	1000		EF-001	MFT-1000		CCF-102	CT280A	
C220	2.2 N330 ±.25mmf					*		
C221	10 NPO 5%		NPO-SI 10	TCZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C222	.5-2.0	Pt. WT30X56						
C223	1000		EF-001	MFT-1000		CCF-102	CT280A	
C224	1000		EF-001	MFT-1000		CCF-102	CT280A	

VHF TUNER PARTS LIST (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C225	1000		EF-001	MFT-1000		CCF-102	CT280A	

Note 1. May not be used in some versions.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R201	12K	
R202	47K	
R203	120K	
R204	68K	

ITEM No.	RATING	REMARKS
R205	6800Ω	
R206	15K	
R207	220K	
R208	1200Ω	

ITEM No.	RATING	REMARKS
R209	10K	
R210	120K	
R211	15K	

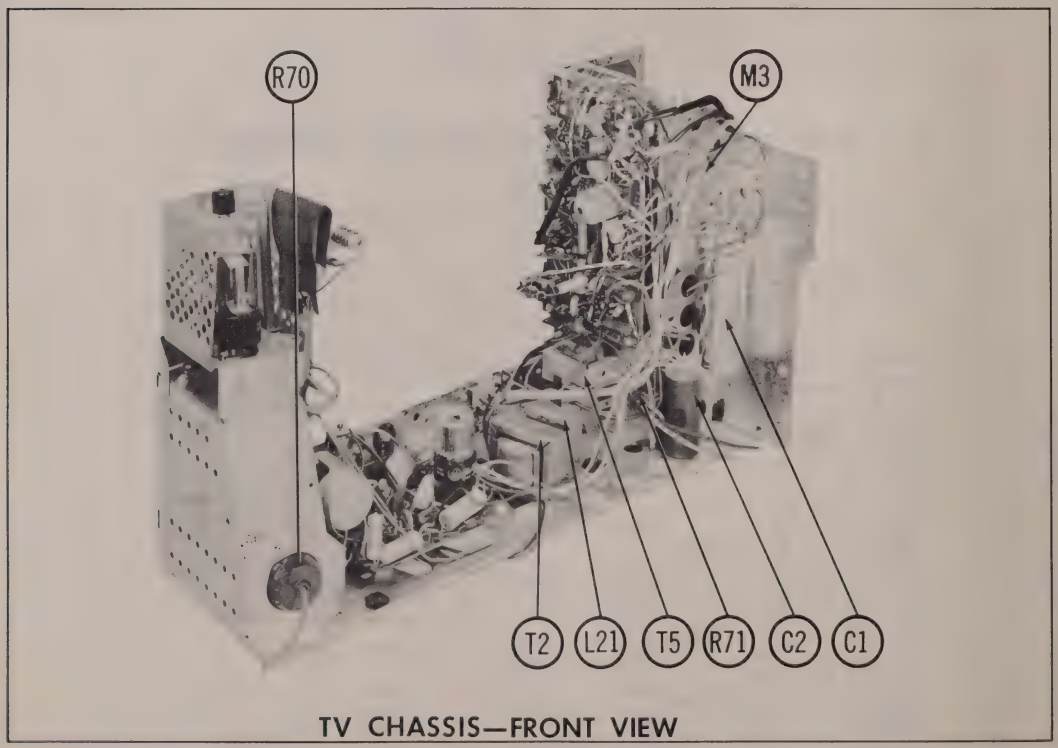
COILS (RF-IF)

ITEM No.	USE	G. E. PART No.	NOTES
L201	Ant. Trans.	WT37X31	
L202	Ant. Coils	WT52X154	Channel 2-13, Includes Wafer Assembly
L203	RF Coils	WT52X155	Channel 2-12, Includes Wafer Assembly
L204	Mixer Grid Coils	WT52X156	"

ITEM No.	USE	G. E. PART No.	NOTES
L205	Osc. Coils	WT52X157	Channel 2-12, Includes Wafer Assembly
L206	Mixer Plate Coil	WT36X428	
L207	RF Choke	WT36X408	
L208	Fil. Choke		
L209	Fine Tuning Coil	WT36X429	

MISCELLANEOUS

ITEM No.	PART NAME	G. E. PART No.	NOTES
	Spacer	WT3X334	Plastic Wafer (Between Front Plate & Oscillator Wafer)
	Spacer	WT3X338	Plastic Wafer (Between Antenna Coil Wafer & RF Coil Wafer)
	Spacer	WT3X339	Plastic Wafer (Between Mixer Grid Coil Wafer & Osc. Coil
	Spacer	WT3X341	Plastic Wafer (Back of Antenna Coil Wafer) Wafer)
	Spacer	WT3X344	Plastic Wafer (Between Mixer Grid Coil Wafer & RF Coil Wafer)
	Switch Shaft and Index Plate	WT69X211	



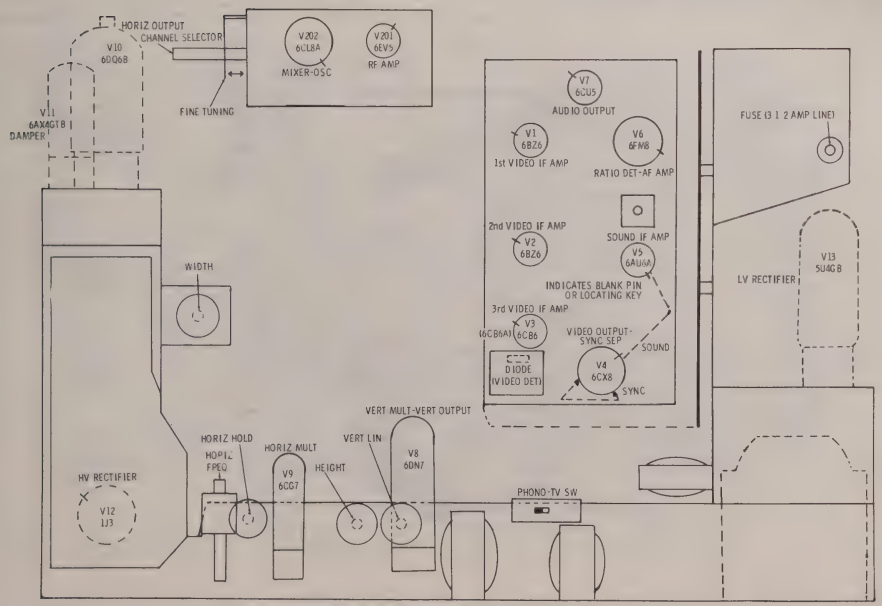
TV CHASSIS—FRONT VIEW

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ6	725K	47Ω	.1Ω	0Ω	▲220Ω	■ 470Ω	0Ω		
V2	6BZ6	■ 68K	▲ 22Ω	.1Ω	0Ω	† 290Ω	290Ω	INF		
V3	6CB6	0Ω	150Ω	.1Ω	0Ω	■ 220Ω	■ 220Ω	0Ω		
V4	6CX8	0Ω	1.9meg	■ 22K	.1Ω	0Ω	82Ω	1meg	■ 0Ω	† 5100Ω
V5	6AU6A	3.3Ω	0Ω	.1Ω	0Ω	■ 10K	■ 10K	270Ω		
V6	6FM8	INF	INF	22K	0Ω	.1Ω	0Ω	0Ω	10meg	† 680K
V7	6CU5	¶	NC	.1Ω	0Ω	410K	† 750Ω	† 1000Ω		
V8	6DN7	● 2.3meg	† 2500Ω	0Ω	● 1.4meg	● † 3meg	0Ω	.1Ω	0Ω	
V9	6CG7	† 15K	2meg	820Ω	.1Ω	0Ω	† 76K	62K	820Ω	0Ω
V10	6DQ6B	TP	0Ω	NC	† 13K	1meg	TP	.1Ω	0Ω	TOP CAP † 25Ω
V11	6AX4GTB	NC	NC	¶	NC	† 70Ω	NC	0Ω	.1Ω	
V12	1J3	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP † 355Ω
V13	5U4GB	NC	¶	NC	31Ω	NC	34Ω	NC	¶	
V14	23KP4	.1Ω	NC	† 680K	† 1meg	NC	47K	● 250K	0Ω	
V201	6EV5	550K	0Ω	0Ω	.1Ω	† 4700Ω	■ 50K	0Ω		
V202	6CL8A	15K	■ 6800Ω	0Ω	0Ω	.1Ω	■ 0Ω	† 120K	0Ω	235K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
♭ MEASURED FROM PIN 3 OF V11.
† MEASURED FROM PIN 8 OF V13.
▲ MEASURED FROM PIN 7 OF V2.
■ MEASURED FROM 120V SOURCE.
NC NO CONNECTION
TP TIE POINT

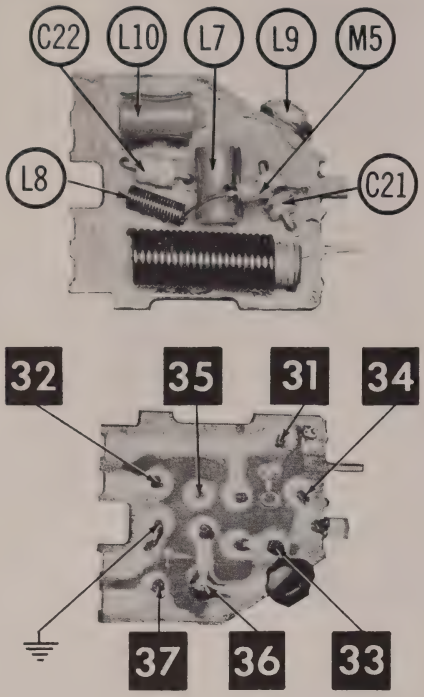
BOTTOM VIEW



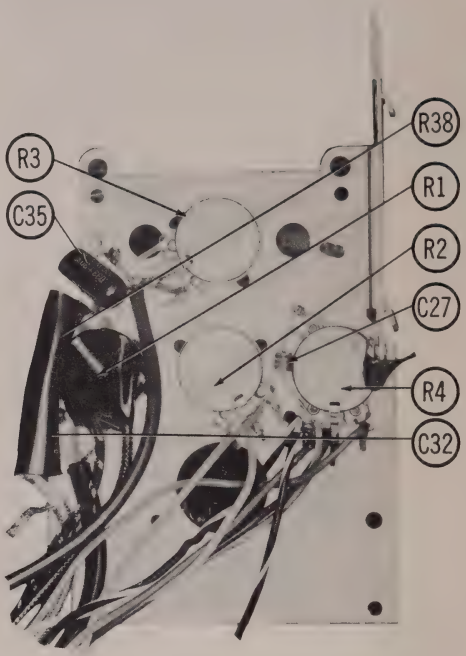
TUBE PLACEMENT CHART

A Howard W. Sams CIRCUITRACE® Photo

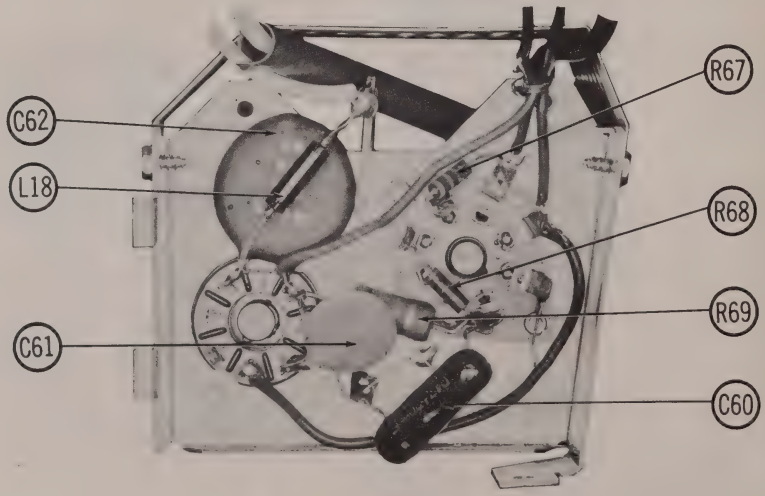
CircuiTrace Numbers 31 thru 37



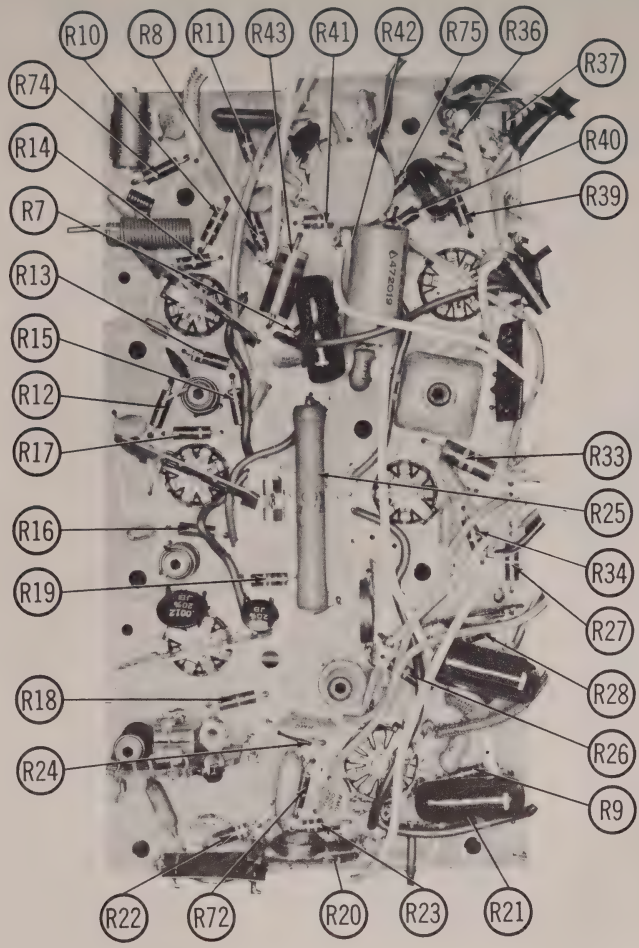
VIDEO DET.
(PLUG IN) PRINTED BOARD



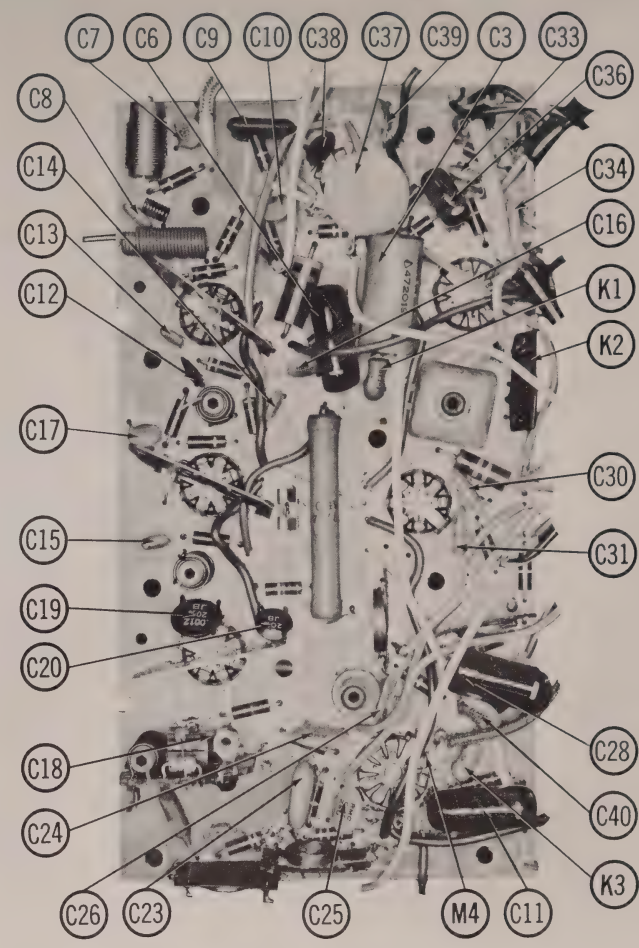
CONTROL PANEL



HORIZ. OUTPUT, DAMPER SUBCHASSIS - BOTTOM VIEW



MAIN PRINTED BOARD - RESISTOR IDENT.



MAIN PRINTED BOARD - CAPACITOR & MISC. IDENT.

AM-FM 100
TUNER ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

AM ALIGNMENT

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of AM Conv. Low side to chassis.	455KC (400∿ 30% Mod.)	(AM) Tuning gang fully open	AC probe to Output Jack. Common to chassis.	A16, A17, A18, A19	Adjust for maximum deflection.
2.	"	1620KC	"	"	A20	"
3.	High side thru .1mfd to pin 1 (grid) of AM RF Amp. Low side to chassis.	1400KC	1400KC Signal	"	A21	"
4.	High side thru 100mmf to AM Antenna Terminal. Low side to chassis.	"	"	"	A22	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	High side thru .001mfd to pin 2 (grid) of FM Mixer. Low side to chassis.	10.7MC (Unmod.)	(FM) Tuning gang fully open	DC probe to point ◇J◇. Common to chassis.	A23, A24, A25, A26, A27, A28	Adjust for maximum deflection.
6.	"	"	"	DC probe to point ◇K◇. Common to chassis.	A29	"
7.	"	"	"	DC probe to point ◇L◇. Common to chassis.	A30	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	High side thru .001mfd to pin 2 (grid) of FM Conv. Low side to chassis.	10.7MC (450KC Swp)	(FM) Tuning gang fully open	Vert. Amp. to point ◇J◇. Low side to chassis.	A23, A24, A25, A26, A27, A28	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
6.	"	"	"	Vert. Amp. to point ◇K◇. Low side to chassis.	A29	"
7.	"	"	"	Vert. Amp. to point ◇L◇. Low side to chassis.	A30	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A29 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	High side thru 270Ω to FM Antenna Terminal. Low side to chassis.	106MC (Unmod.)	(FM) 106MC	DC probe to point ◇J◇. Common to chassis.	A31, A32, A33	Adjust for maximum deflection.
9.	"	90MC	90MC	"	A34, A35, A36	Adjust for maximum deflection. Repeat steps 8 and 9.

FIG. 1

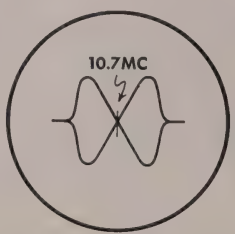
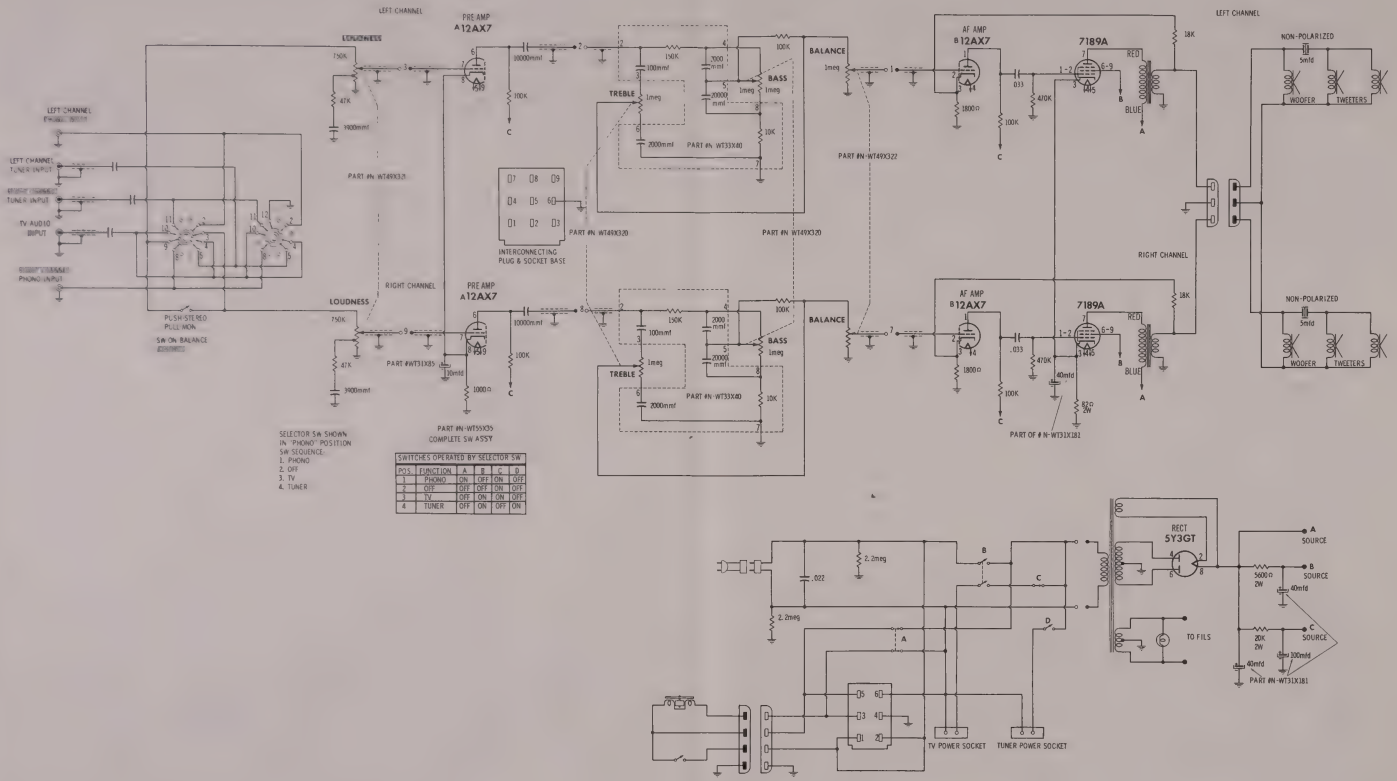


FIG. 2



SWITCHES OPERATED BY SELECTOR SW					
POS.	FUNCTION	A	B	C	D
1	PHONO	ON	OFF	ON	OFF
2	OFF	OFF	OFF	ON	OFF
3	TV	OFF	ON	ON	OFF
4	TUNER	OFF	ON	OFF	ON

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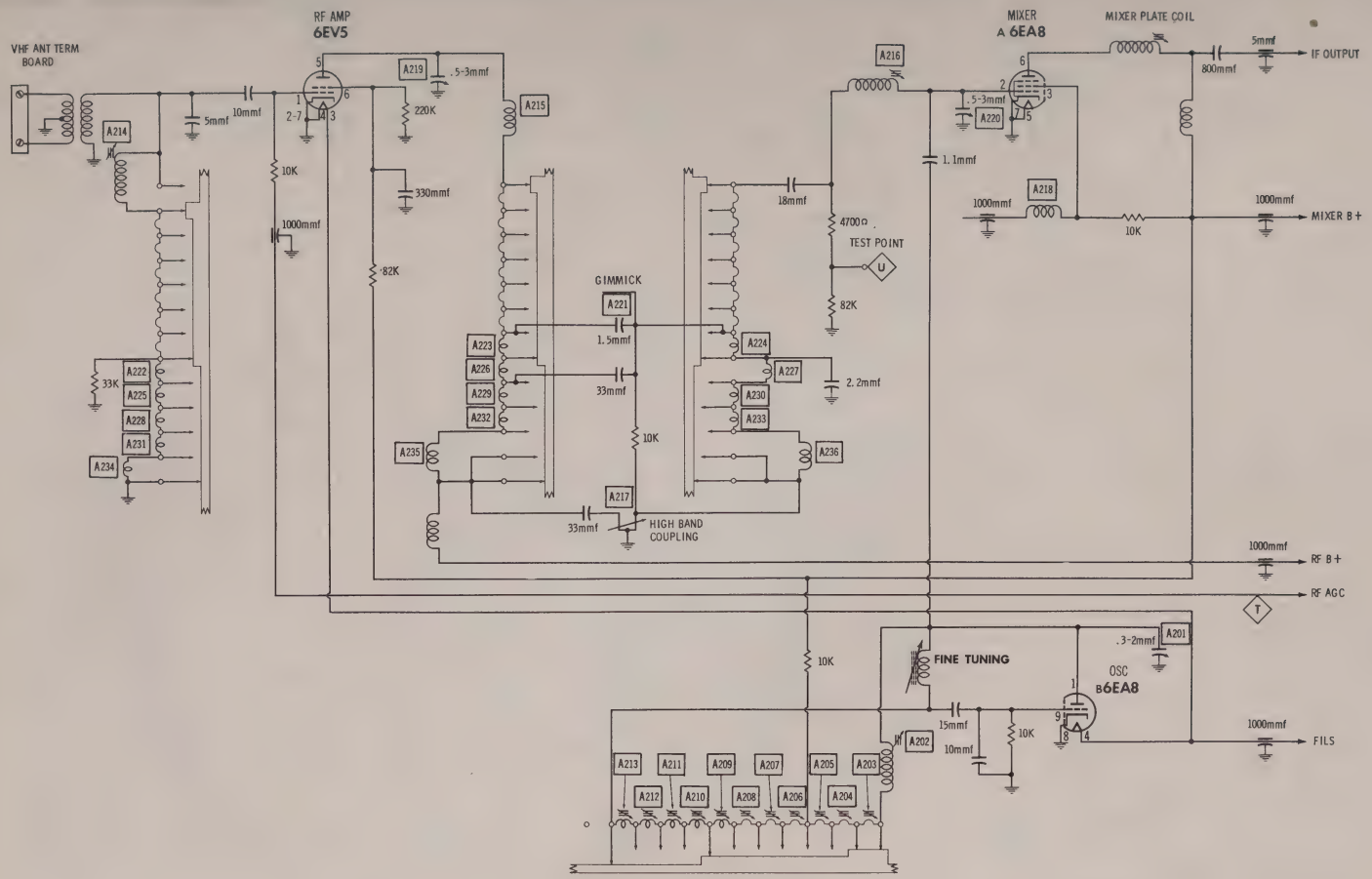
STEREO AMPLIFIER SCHEMATIC



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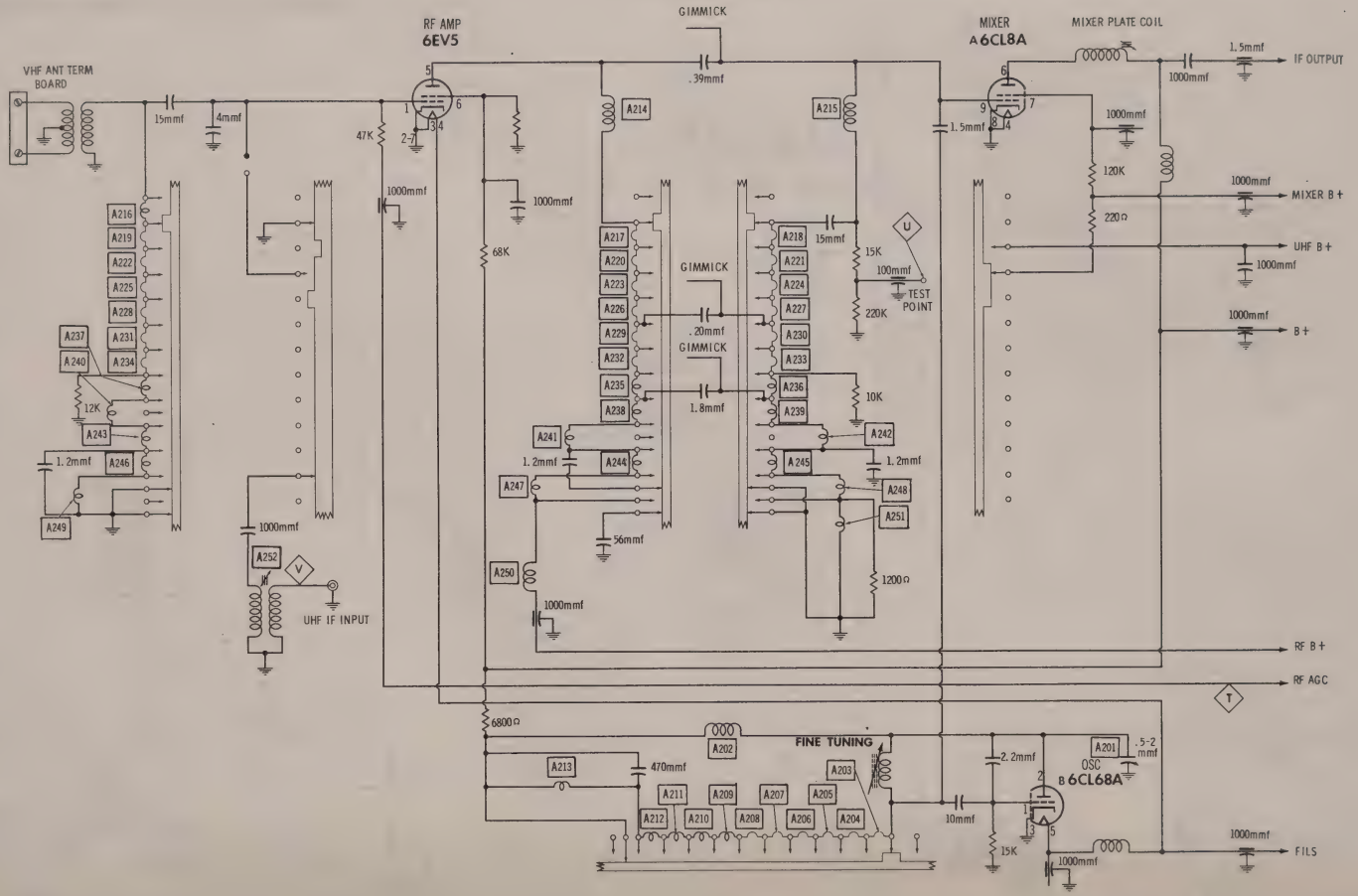
VHF TUNER WT86X98

GENERAL ELECTRIC CHASSIS M6



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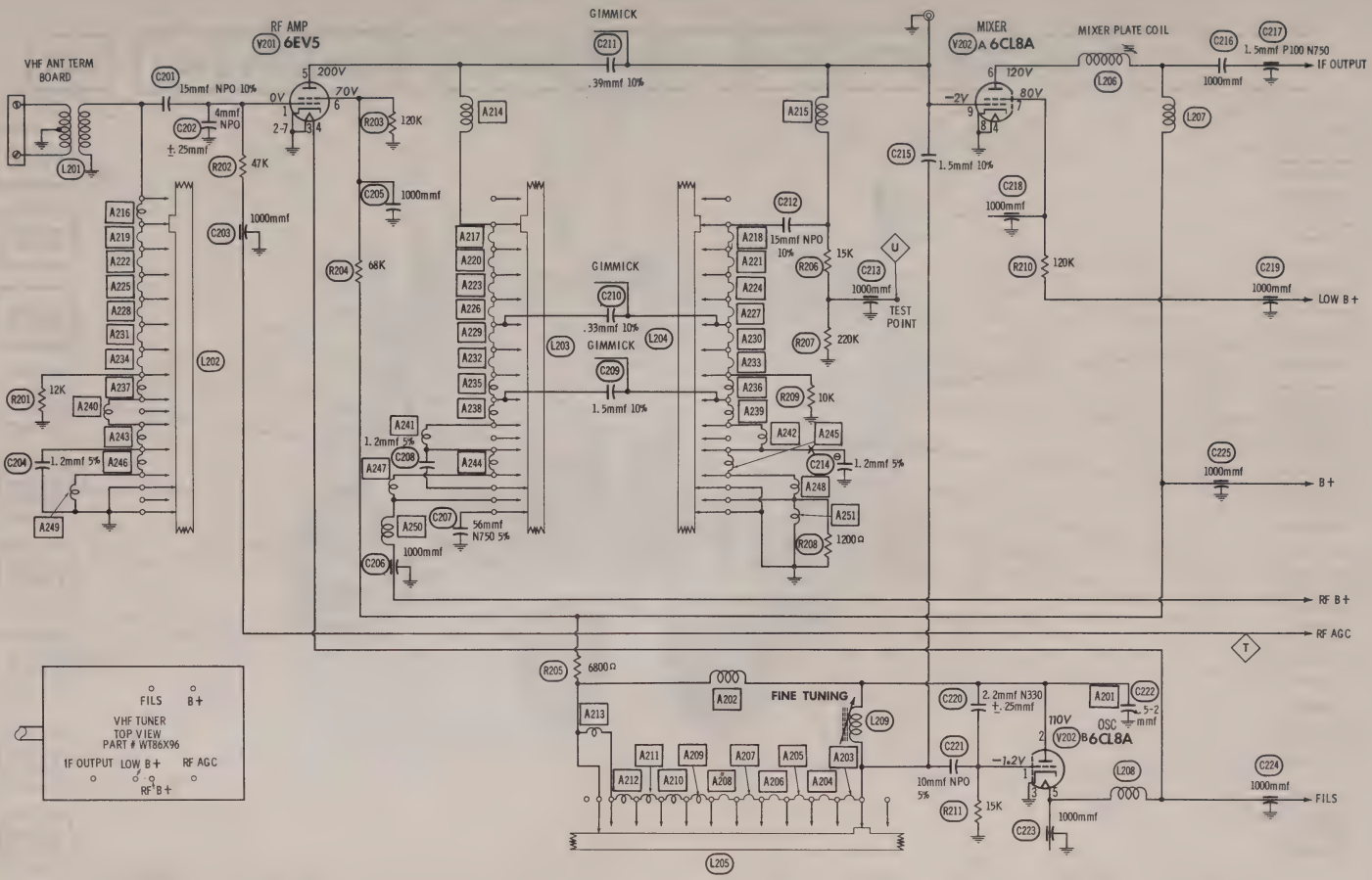
VHF TUNER with UHF Provisions - WT86X97



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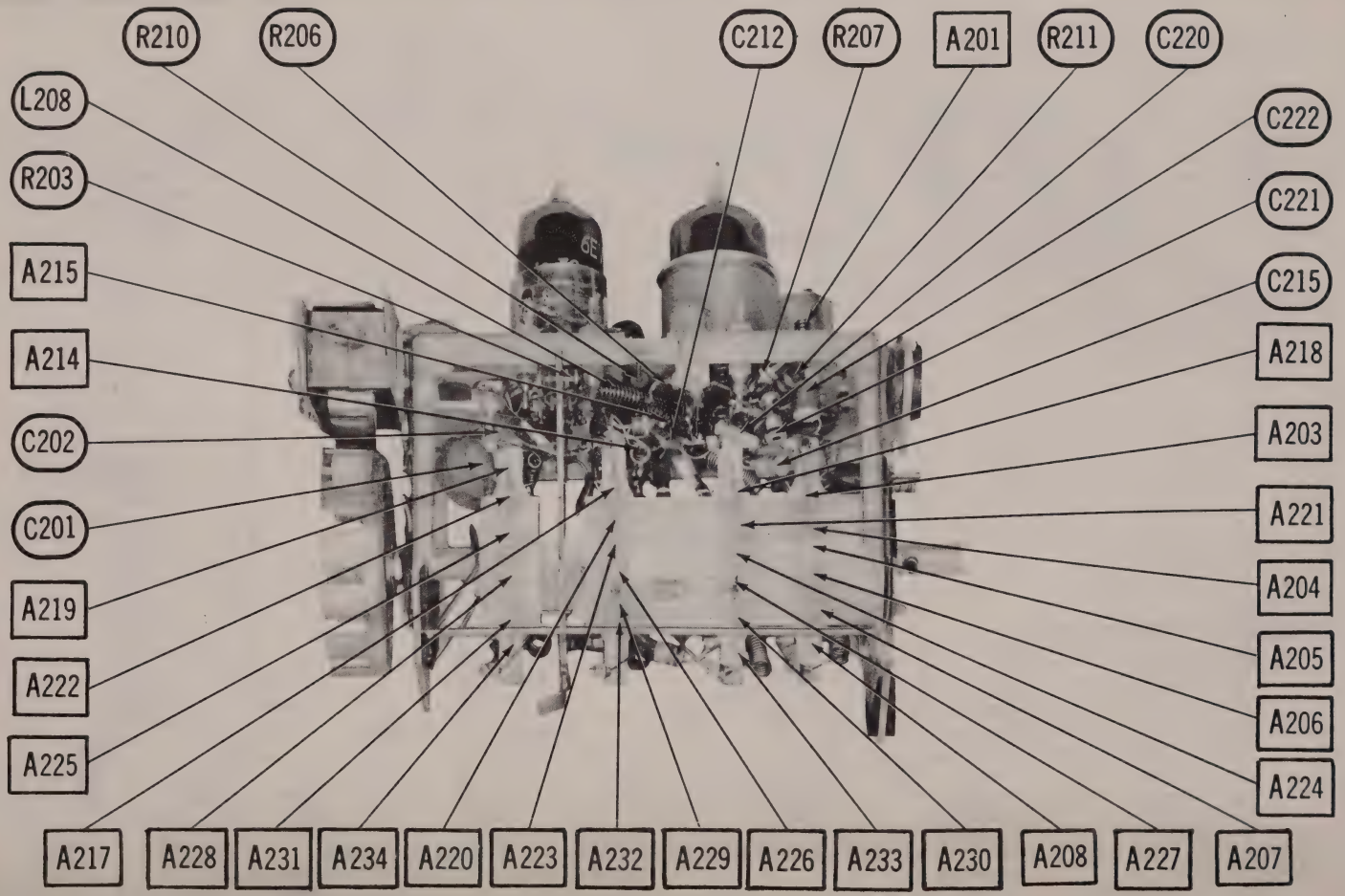
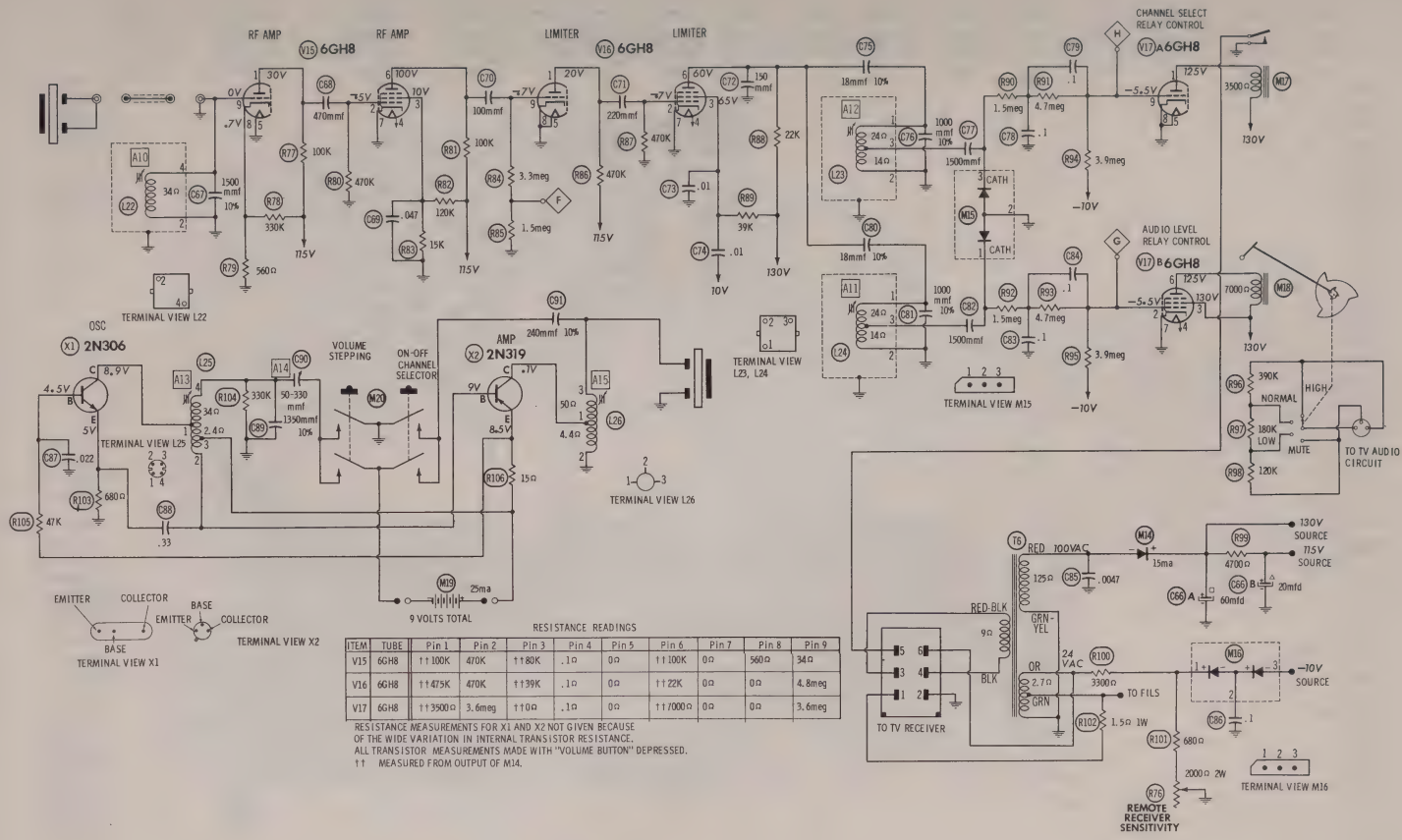
VHF TUNER WT86X96

GENERAL ELECTRIC
CHASSIS M6



VHF TUNER WT86X96 - LEFT SIDE



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V15	6GH8	††100K	470K	††80K	.1Ω	0Ω	††100K	0Ω	560Ω	34Ω
V16	6GH8	††475K	470K	††39K	.1Ω	0Ω	††22K	0Ω	0Ω	4.8meg
V17	6GH8	††3500Ω	3.6meg	††0Ω	.1Ω	0Ω	††7000Ω	0Ω	0Ω	3.6meg

RESISTANCE MEASUREMENTS FOR X1 AND X2 NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.
ALL TRANSISTOR MEASUREMENTS MADE WITH "VOLUME BUTTON" DEPRESSED.
†† MEASURED FROM OUTPUT OF M14.

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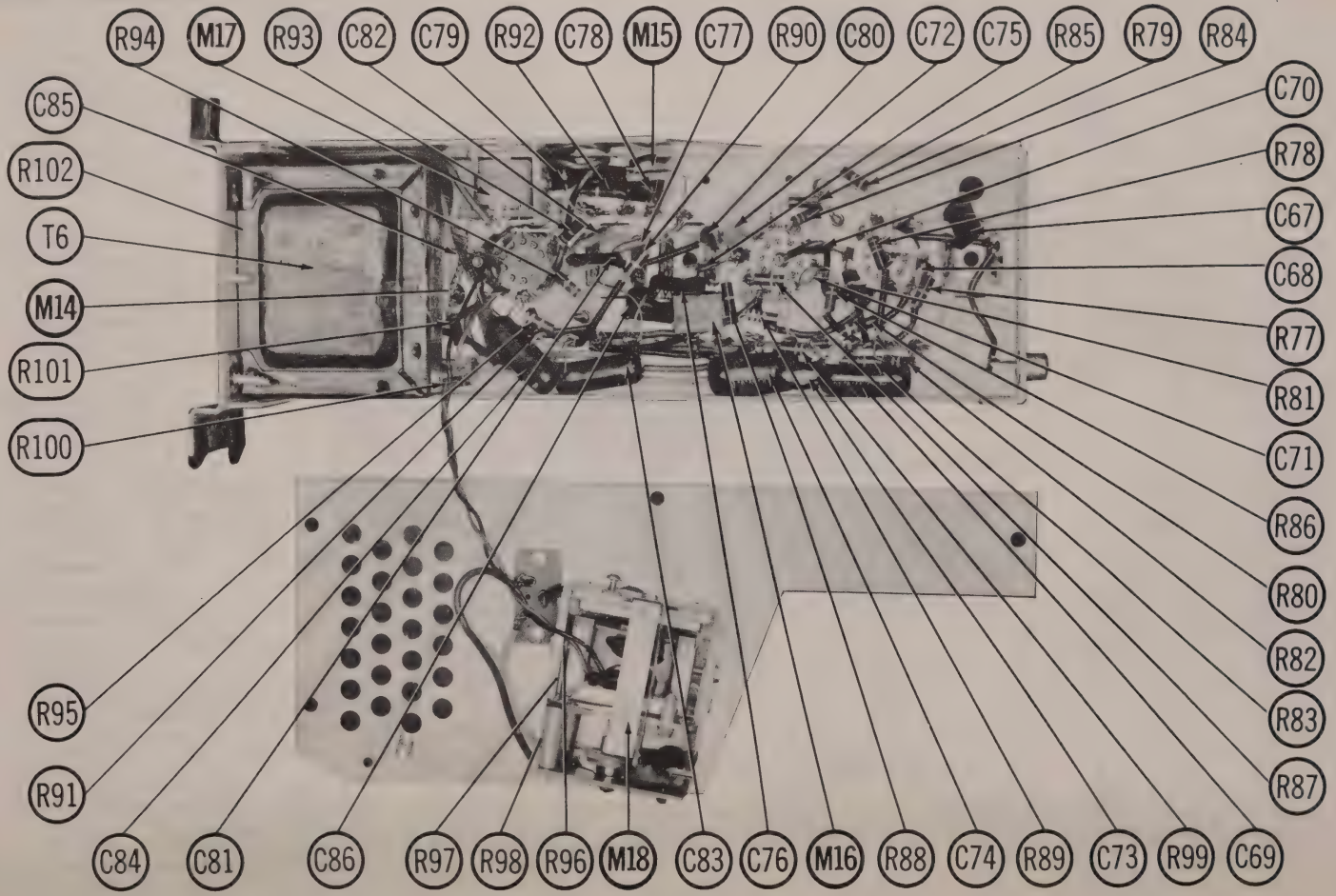
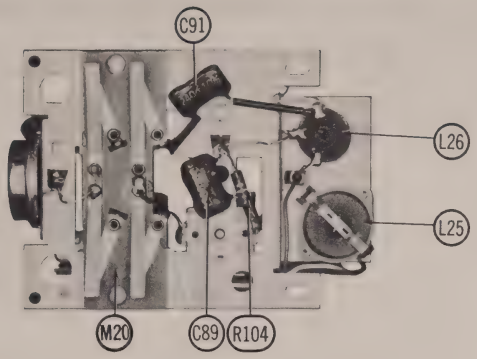
REMOTE CONTROL RECEIVER & TRANSMITTER

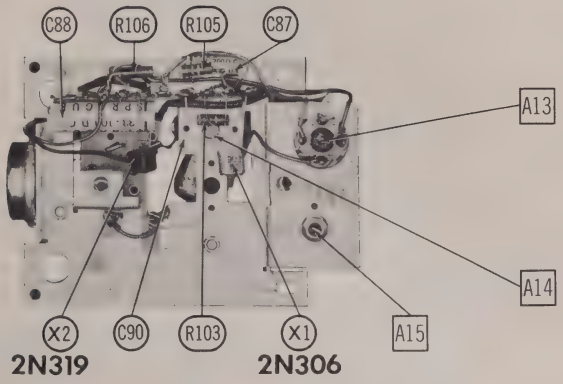
GENERAL ELECTRIC
CHASSIS M6



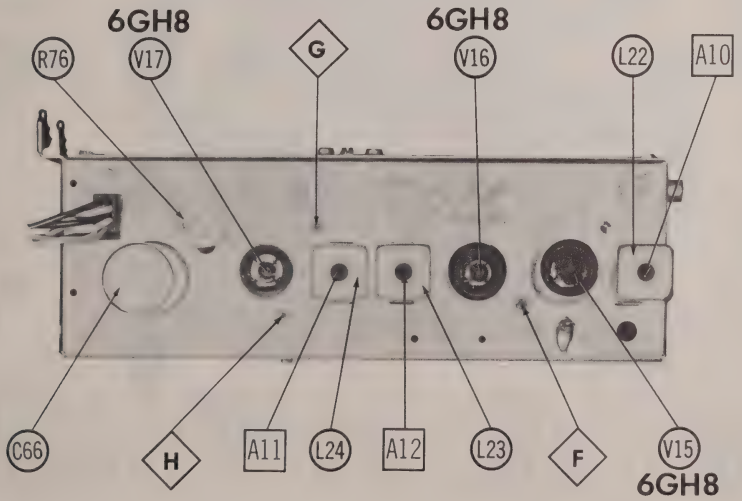
REMOTE CONTROL RECEIVER - BOTTOM VIEW



REMOTE CONTROL TRANSMITTER - TOP VIEW



REMOTE CONTROL TRANSMITTER - BOTTOM VIEW



REMOTE CONTROL RECEIVER - TOP VIEW

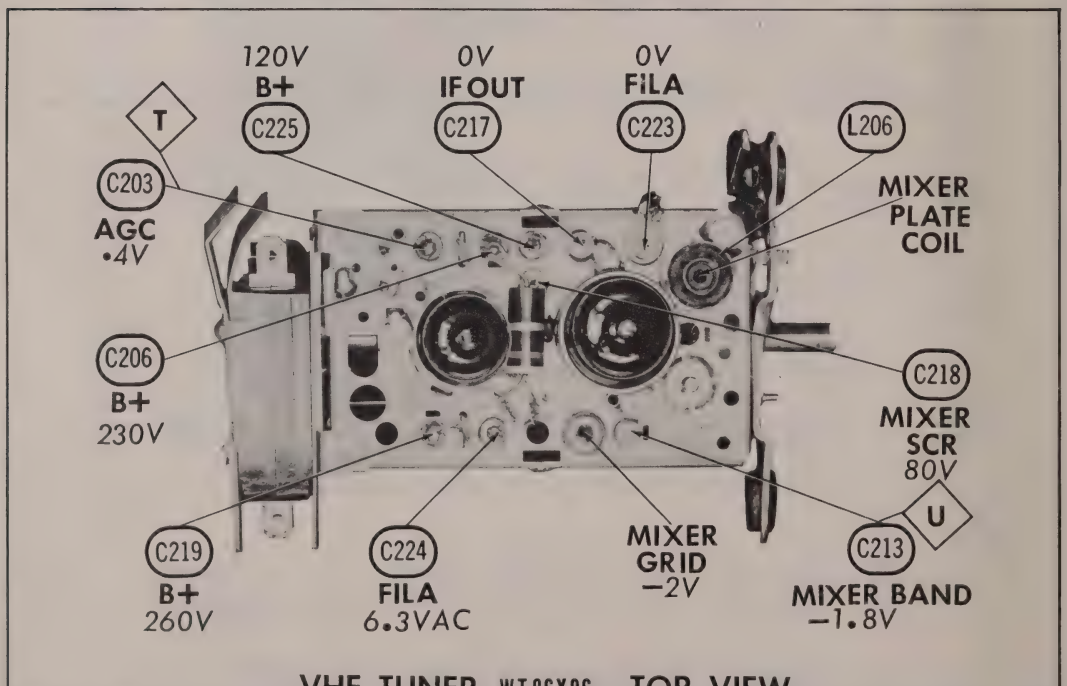
REMOTE CONTROL — ALIGNMENT INSTRUCTIONS

REMOTE RECEIVER ALIGNMENT

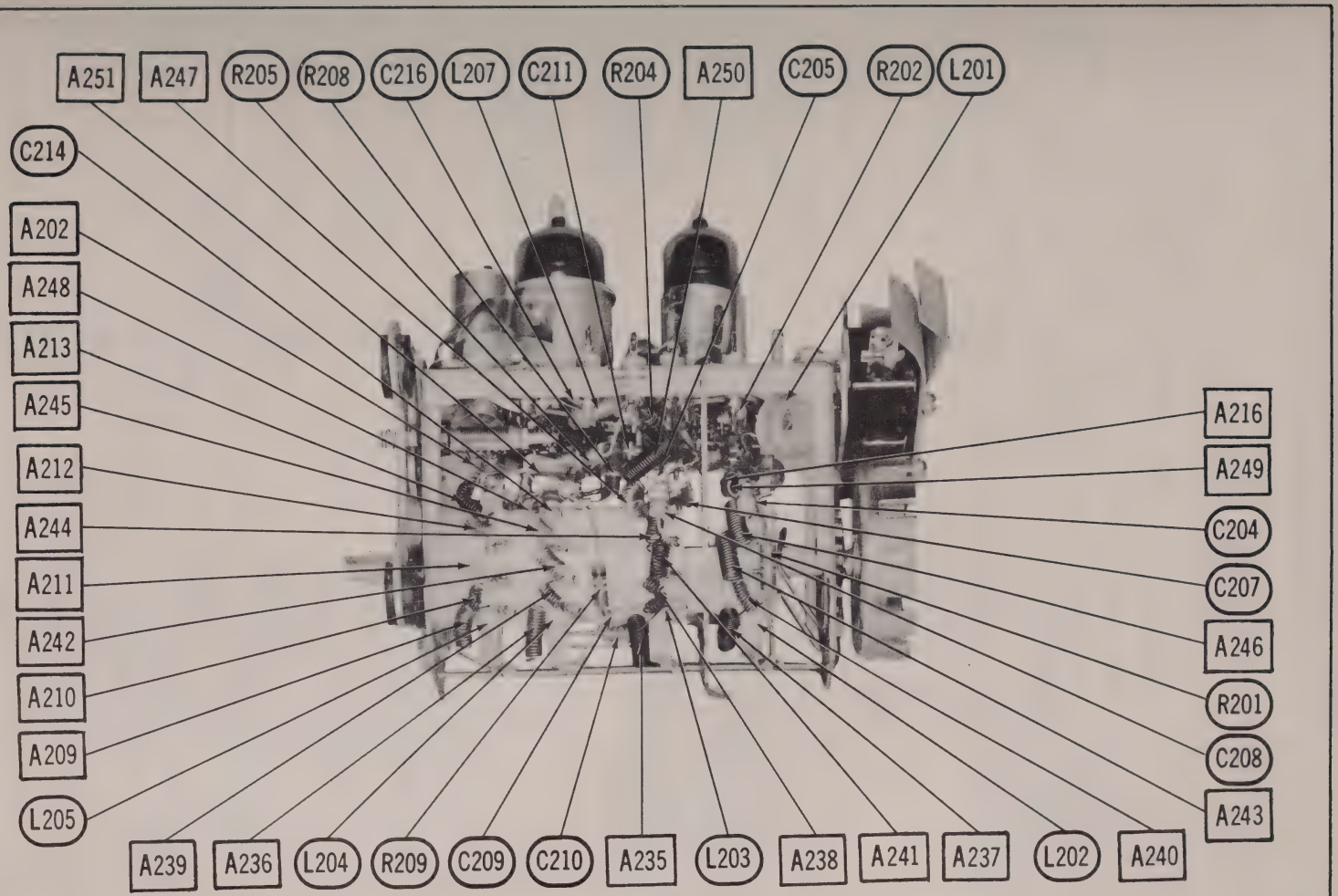
	SIGNAL GENERATOR COUPLING	CONNECT SCOPE	ADJUST	REMARKS
1.	Use Remote Transmitter. Place about 1 foot from Receiver with Output Transducer facing pickup.	Vert. Amp. to point Ⓕ. Low side to chassis.	A10	Press Selector Button on Transmitter and adjust for maximum scope indication.
2.	"	"		Press Volume Button and measure deflection on scope. Release Volume Button and press Selector Button. Retouch A10 so that scope deflection is equal to that obtained when Volume Knob is pressed.
3.	"	Use VTVM with at least 100meg input impedance. DC probe to point Ⓖ. Common to chassis. Use negative scale.	A11	Press Volume Button and adjust A11 for MINIMUM deflection.
4.	"	DC probe to point Ⓗ. Common to chassis.	A12	Press Selector Button and adjust A12 for MINIMUM deflection. Adjust Sensitivity Control to the point where each press of the button causes the proper relay to function.

REMOTE TRANSMITTER ALIGNMENT

	SIGNAL GENERATOR COUPLING	CONNECT VTVM	ADJUST	REMARKS
5.	Place Remote Transmitter about one foot from Remote Receiver with Transducer facing pickup.	DC probe to point Ⓗ. Common to chassis.	A13	Adjust Sensitivity Control of Receiver for -10 volts on VTVM. Press Select Button and adjust A13 for MINIMUM deflection on VTVM.
6.	"	DC probe to point Ⓖ. Common to chassis.	A14	Press Volume Button and adjust A14 for MINIMUM deflection on VTVM.
7.	Move the Transmitter away from the Receiver Input until the Relays just operate and measure the Voltage produced by each function. Select the button that produces the lowest Voltage and press this button while adjusting A15 for maximum deflection. Recheck the Output of these functions. Where the same function is weakest, no further alignment is necessary. If the other is now the weaker, repeat steps 5 thru 7. Adjust Sensitivity Control of Receiver, as in step 4 of Remote Receiver Alignment.			



VHF TUNER WT86X96—TOP VIEW



VHF TUNER WT86X96 - RIGHT SIDE

TUNER ALIGNMENT INSTRUCTIONS

WT86X96, WT86X97

PRE-ALIGNMENT INSTRUCTIONS

The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A201.....GENERAL CEMENT #8721, 8722
WALSCO # 2519

VHF OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Set the Fine Tuning to the center of its range.
Connect the negative lead of a 3 volt bias supply to point Ⓣ. Positive to chassis.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Preset A201 at center of its range. Replace tuner cover each time to observe response on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Fig. 201	Across VHF Antenna terminals thru matching network (Fig. 201).	213MC	211.25MC	13	Vert. Amp. thru 10K across Video Detector load	A202,	Adjust to place Video marker at 50% on response curve as shown in Fig. 202.
			207MC	205.25MC	12		A203,	
			201MC	199.25MC	11		A204,	
			195MC	193.25MC	10		A205,	
			189MC	187.25MC	9		A206,	
			183MC	181.25MC	8		A207,	
			177MC	175.25MC	7		A208,	
			85MC	83.25MC	6		A209,	
			79MC	77.25MC	5		A210,	
			69MC	67.25MC	4		A211,	
			63MC	61.25MC	3		A212,	
			57MC	55.25MC	2		A213	

VHF RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Connect the negative lead of a 3 volt bias supply to point Ⓣ. Positive to chassis.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Disconnect IF link from IF strip and terminate with a 68 ohm resistor at open end only. Tuner cover must be in place when observing response on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Fig. 201	Across VHF antenna terminals thru matching network (Fig. 201).	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 10K to point Ⓤ. Low side to chassis.	A214, A215, A216	Adjust in numerical order for maximum gain and symmetry of response similar to Fig. 203. A214 controls marker position. A215 controls tilt, A216 controls gain.
3.	"	"	207MC	205.25MC 209.75MC	12	"	A217, A218, A219	Adjust in numerical order for response similar to Fig. 203. Adjust first coil for proper marker position, second coil for proper tilt and third coil for maximum gain.
4.	"	"	201MC	199.25MC 203.75MC	11	"	A220, A221, A222	"
5.	"	"	195MC	193.25MC 197.75MC	10	"	A223, A224, A225	"
6.	"	"	189MC	187.25MC 191.75MC	9	"	A226, A227, A228	"
7.	"	"	183MC	181.25MC 185.75MC	8	"	A229, A230, A231	"
8.	"	"	177MC	175.25MC 179.75MC	7	"	A232 A233, A234	"
9.	"	"	85MC	83.25MC 87.75MC	6	"	A235, A236, A237,	"
10.	"	"	79MC	77.25MC 81.75MC	5	"	A238, A239, A240	"
11.	"	"	69MC	67.25MC 71.75MC	4	"	A241, A242, A243	"
12.	"	"	63MC	61.25MC 65.75MC	3	"	A244, A245, A246	"
13.	"	"	57MC	55.25MC 59.75MC	2	"	A247, A248, A249	"

TUNER ALIGNMENT INSTRUCTIONS (Con't)

WT86X96, WT86X97

UHF IF ALIGNMENT

Disconnect IF link from Video IF strip and terminate open end with a 68Ω resistor.
Connect the negative lead of a 3 volt bias supply to point (T). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	120Ω Carbon Resistor	High side thru 120Ω to point (V). Low side to chassis.	42MC	40.5MC 45.75MC	UHF	Vert. Amp. thru 10K to point (U). Low side to chassis.	A250, A251, A252	Adjust for maximum gain and symmetry of response similar to Fig. 204. Adjust A251 to position 40.5MC marker, A252 to position 45.75MC marker and A253 for maximum gain and zero tilt.

UHF TUNER ALIGNMENT

This portion of the tuner has been properly aligned at the factory and is very stable. Alignment of this portion should not be attempted in the field.

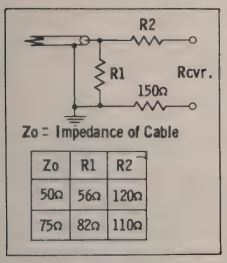


FIG. 201

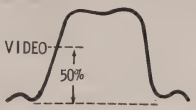


FIG. 202

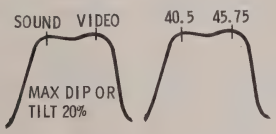
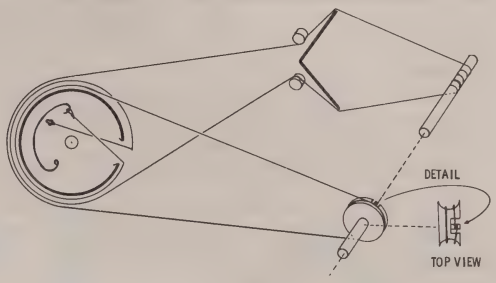
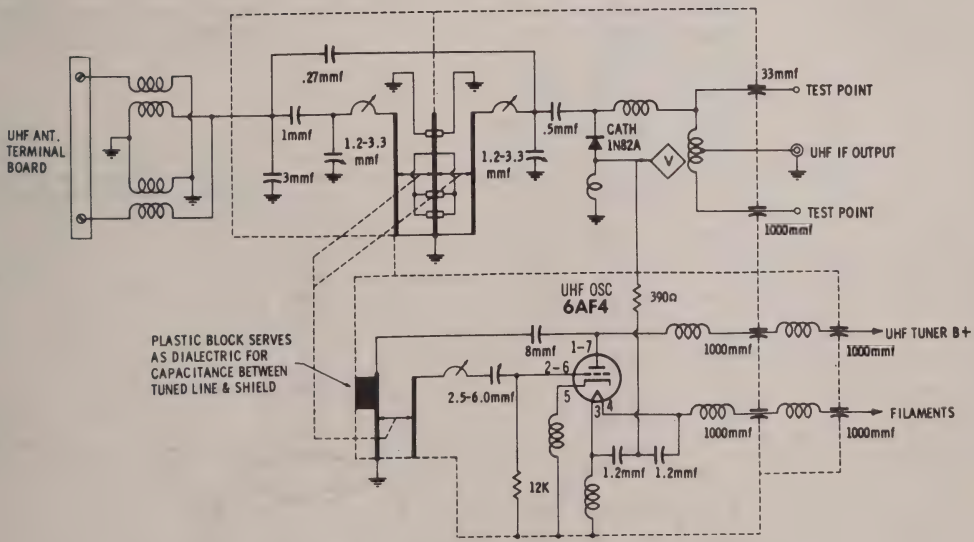


FIG. 203 FIG. 204



UHF DRIVE CORD STRINGING



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UHF TUNER WT86X25

TUNER ALIGNMENT INSTRUCTIONS

WT86X98

PRE-ALIGNMENT INSTRUCTIONS

The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VHF OSCILLATOR ALIGNMENT

Connect the negative lead of a 3 volt bias supply to point Ⓣ. Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Tuner cover must be in place when observing response curve on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Fig. 201	Across VHF antenna terminals thru matching network (Fig. 201).	213MC	211.25MC	13	Vert. Amp. thru 10K across Video Det. load.	A202	Adjust to place Video marker at 50% on response curve as in Fig. 202.
			207MC	205.25MC	12		A203	
			201MC	199.25MC	11		A204	
			195MC	193.25MC	10		A205	
			189MC	187.25MC	9		A206	
			183MC	181.25MC	8		A207	
			177MC	175.25MC	7		A208	
			85MC	83.25MC	6		A209	
			79MC	77.25MC	5		A210	
			69MC	67.25MC	4		A211	
			63MC	61.25MC	3		A212	
			57MC	55.25MC	2		A213	

VHF RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Connect the negative lead of a 3 volt bias supply to point Ⓣ. Positive to chassis.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Disconnect IF link from Video IF strip and terminate open end with a 68Ω resistor. Tuner cover must be in place when observing response curve on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Fig. 201	Across VHF antenna terminals thru matching network.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 10K to point Ⓤ. Low side to chassis.	A214, A215, A216, A217, A218	Adjust A214, A215 and A216 for maximum gain and symmetry of response similar to Fig. 203. Adjust A217 (gimmick) for proper bandwidth. If dip is excessive, adjust A218.
3.	"	"	177MC	175.25MC 179.75MC	7	"	A219, A220, A221	Adjust A219 and A220 for maximum gain and symmetry of response similar to Fig. 203. Adjust A221 (gimmick) for proper bandwidth.
4.	"	"	207MC	205.25MC 209.75MC	12	"		Check for response similar to Fig. 203. If necessary, make compromise adjustment of A219 and A220 best response on all channels.
			201MC	199.25MC 203.75MC	11			
			195MC	193.25MC 197.75MC	10			
			189MC	187.25MC 191.75MC	9			
			183MC	181.25MC 185.75MC	8			
5.	"	"	85MC	83.25MC 87.75MC	6	"	A222, A223, A224	Adjust for maximum gain and symmetry of response similar to Fig. 203 with markers as shown.
6.	"	"	79MC	77.25MC 81.75MC	5	"	A225, A226, A227	"
7.	"	"	69MC	67.25MC 71.75MC	4	"	A228, A229, A230	"
8.	"	"	63MC	61.25MC 65.75MC	3	"	A231, A232, A233	"
9.	"	"	57MC	55.25MC 59.75MC	2	"	A234, A235, A236	"

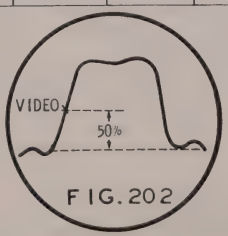
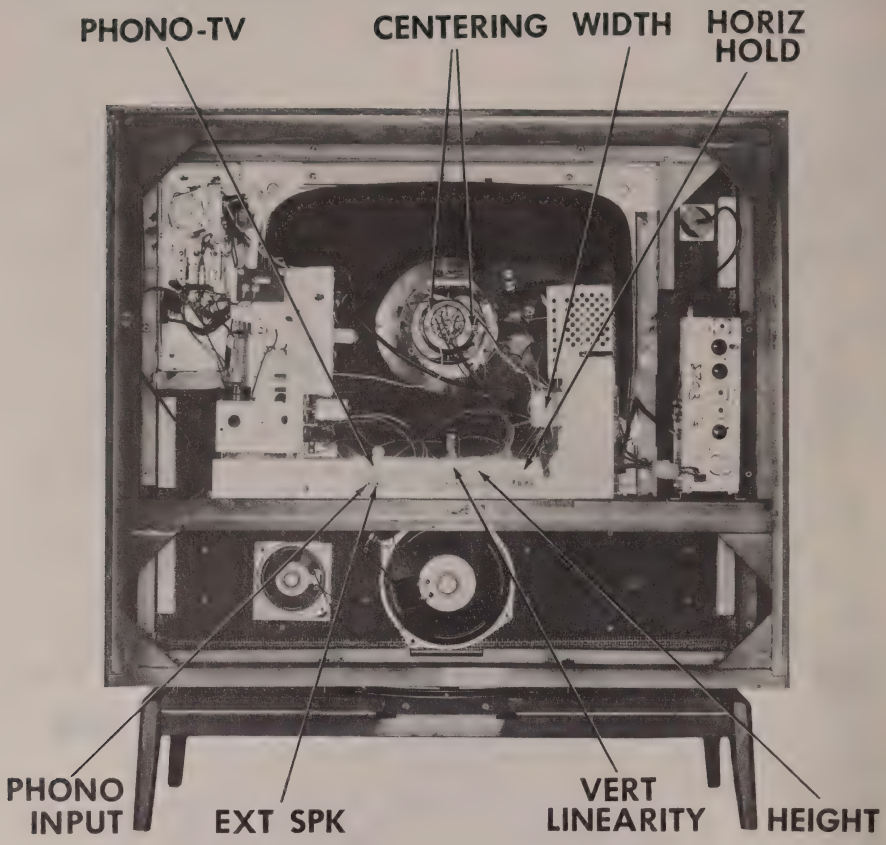


FIG. 202

FIG. 203



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Tune the receiver to a weak signal and adjust the controls for a normal picture.

Connect a short clip lead from TP-4 to chassis. Connect a 1000 ohm resistor across Horizontal Stabilizing Coil (L19).

Adjust the Horizontal Hold control to the point where the picture appears to float back and forth across the screen.

Remove the 1000 ohm resistor and adjust the Horizontal Frequency Slug (B1) until the picture again appears to float back and forth across the screen. Remove the clip lead from TP-4 and chassis.

Adjust Width Switch for a picture slightly larger than necessary to fill picture mask horizontally.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL MODEL R740VCD

1. Remove 6 push-on type knobs in front.
2. Remove 7 wood screws holding rear cover. Remove rear cover.
3. Remove 4 screws holding control panel.
4. Remove yoke, picture tube socket, high voltage lead, and speaker leads.
5. Remove 4 chassis bolts.
5. Remove chassis.

PICTURE TUBE REMOVAL

It is necessary to remove the chassis for picture tube removal.

PHOTOFACT® Folder

PRODUCTION CHANGE BULLETIN 250

MOTOROLA MODELS Y21T57CHD, 21C9BD, MD, 21K99BD, MD, WD, 21K115B, M, W, 21K116B, M, MC, W, 21T57BGD, CHD, MGD, 21T62M, 21T63B, M, W (CH. MTS-551, Y, VTS-551)

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 1 IN SET 435

Motorola Models Y21C9B, M, Y21K97B, M, Y21K99B, M, Y21T57BG, CH, MG, 21C9B, M, 21K97B, M, 21K99B, M, 21T57BG, CH, MG (Ch. TS-551, Y, WTS-551, Y) were covered in PHOTOFACT Folder 1 - Set 435.

Models Y21T57CHD, 21C9BD, MD, 21K99BD, MD, WD, 21K115B, M, W, 21K116B, M, MC, W, 21T57BGD, CHD, MGD, 21T62M, 21T63B, M, W (Ch. MTS-551, Y, VTS-551) which are electrically similar except for the following changes are added with the publication of this bulletin.

Ch. MTS-551

TUNER CHANGE

The tuner is changed to CMTT-102 (Part #1U749007).

Ch. VTS-551

TUNER CHANGE

The tuner is changed to VCMTT-102 (Part #1U749021).

A schematic diagram and parts list for these tuners may be found in PHOTOFACT Folder 1 - Set 464.

(Continued On The Reverse Side)

PRODUCTION CHANGE BULLETIN 250

PILOT MODEL 1060A

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 12 IN SET 450

Pilot Models P-1060, P-1060M were covered in PHOTOFACT Folder 12 - Set 450.

Model 1060A which is electrically similar except for the following changes is added with the publication of this bulletin.

COMPONENTS CHANGED

R7 is increased from 39K to 47K.

R29 is increased from 39K to 47K.

R42 is decreased from 12K to 4700Ω.

T3 (Output Transformer) is changed to Part #56-62.

The Auxiliary Input of each channel is omitted.

COMPONENTS ADDED

A Multiplex Input and a Tuner Input are added to M3 (Selector Switch).

The Selector Switch (M3) is changed to Part #100-133B.

A Speaker Selector Switch (Part #100-158) is added. A partial schematic diagram showing the switch is given in this bulletin.

(Continued On The Reverse Side)

PRODUCTION CHANGE BULLETIN 250

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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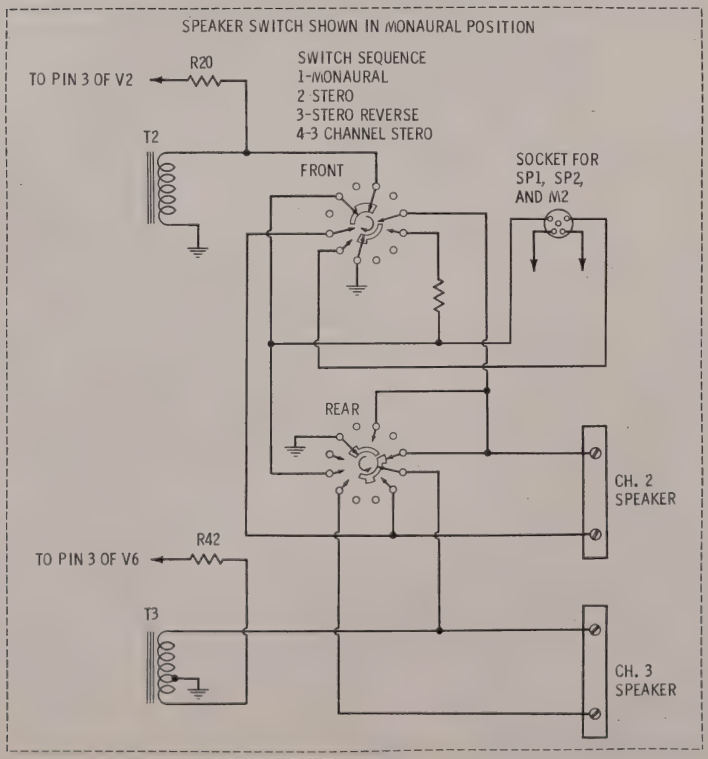
MODEL	CHANNEL SELECTOR VHF	FINE TUNING	VOLUME	BRIGHTNESS	CONTRAST	VERT HOLD	SAFTEY GLASS	CABINET
Y21T57CHD	36K749384	36C743540	36K747576	36C747573	36K747575	36K747574	61K743151	16K747545
21C9BD	36K749384	36K743541	36K748444	36K748441	36K748443	36K748442	61K743150	16K749131
21C9MD	36K749384	36K743541	36K748444	36K748441	36K748443	36K748442	61C743150	16E749130
21K99BD	36K749384	36K743541	36K748444	36K748441	36K748443	36K748442	61C743150	16K748054
21K99MD	36K749384	36K743541	36K748444	36K748441	36K748443	36K748442	61C743150	16E748053
21K99WD	36K749384	36K743541	36K748444	36K748441	36K748443	36K748442	61C743150	16K748055
21K115B	36K748429	36C738680	36K747576	36C747573	36K747575	36K747574	61K750153	16K749694
21K115M	36K748429	36C738680	36K747576	36C747573	36K747575	36K747574	61K750153	16E749693
21K115W	36K748429	36C738680	36K747576	36C747573	36K747575	36K747574	61K750153	16K749912
21K116B	36K748429	36C738680	36K749887	36K749884	36K749886	36K749885	61K750153	16K749916
21K116M	36K748429	36C738680	36K749887	36K749884	36K749886	36K749885	61K750153	16E749915
21K116MC	36K748429	36C738680	36K749887	36K749884	36K749886	36K749885	61K750153	16K749918
21K116W	36K748429	36C738680	36K749887	36K749884	36K749886	36K749885	61K750153	16K749917
21T57BGD	36K749384	36K743541	36K747576	36C747573	36K747575	36K747574	61K743151	16K747554
21T57CHD	36K749384	36K743541	36K747576	36C747573	36K747575	36K747574	61K743151	16K747545
21T57MGD	36K749384	36K743541	36K747576	36C747573	36K747575	36K747574	61K743151	16K747553
21T62M	36K749384	36K743541	36K748444	36K748441	36K748443	36K748442	61C743150	16E749589
21T63B	36K748429	36C738680	36K747576	36C747573	36K747575	36K747574	61K750153	16K749721
21T63M	36K748429	36C738680	36K747576	36C747573	36K747575	36K747574	61K750153	16E749720
21T63W	36K748429	36C738680	36K747576	36C747573	36K747575	36K747574	61K750153	16K749914



Webcor Models 2810, 2819, 2820, 2820-1C, 2919, 2923, 2950, 2955 were covered in PHOTOFACT Folder 17 - Set 458.

Model 2103 which is electrically and mechanically similar except for the following changes is added with the publication of this bulletin.

MOTOR ASSEMBLY CHANGE

The motor assembly is changed to Part #15X281.

COMPONENT CHANGES

M2 (Record-Playback Head) is changed to Part #11X2217).

M3 (Erase Head) is changed to Part #11X1956.

R1 (Volume Control) is changed to Part #31P155.

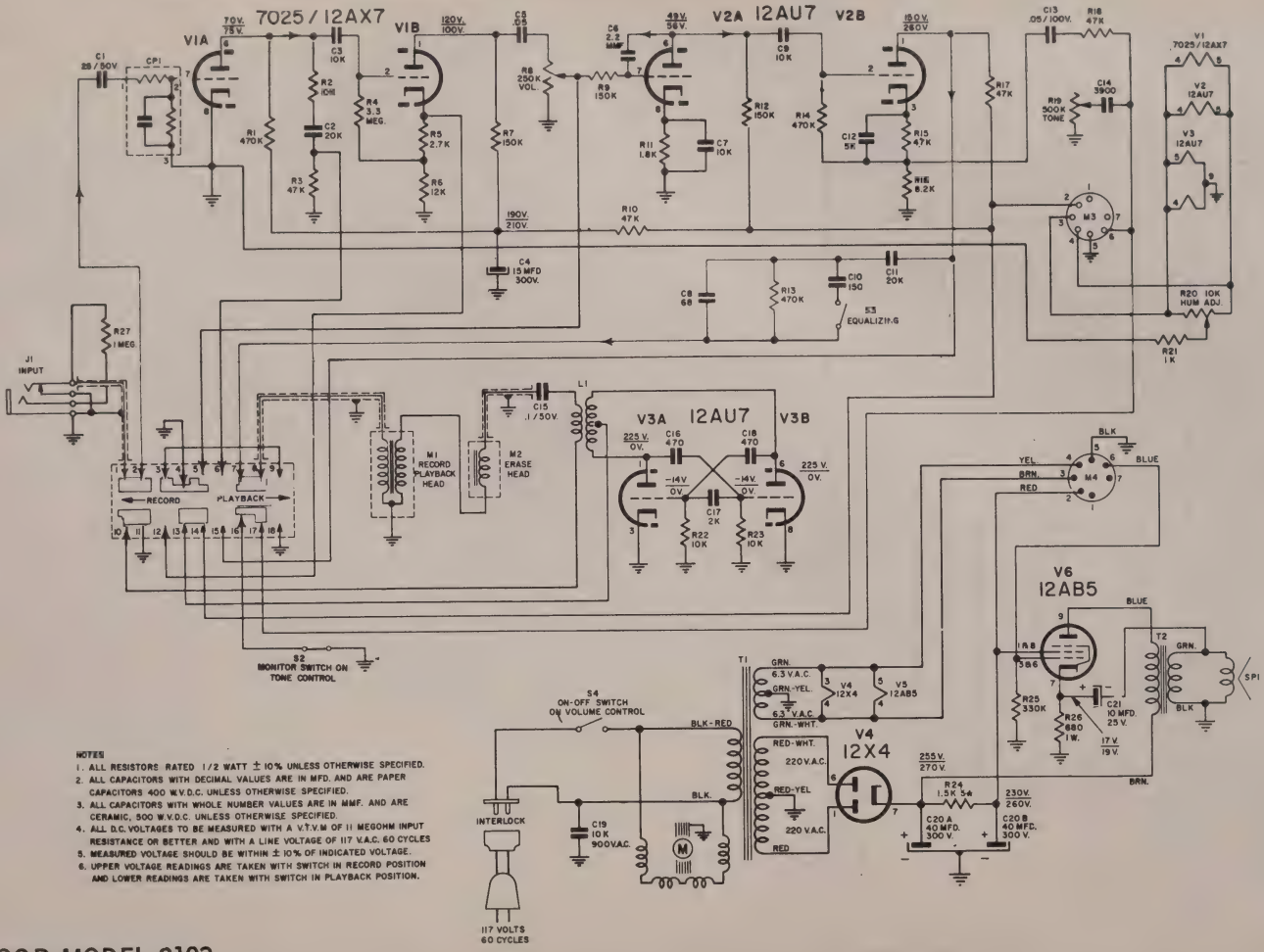
R2 (Tone Control) is changed to Part #31P154.

T1 (Power Transformer) is changed to Part #68P092.

T2 (Audio Output Transformer) is changed to Part #67P089.

V4 (Record Level Indicator) is omitted. A schematic showing the changes made is given in this bulletin.

(Continued On The Reverse Side)



NOTES

1. ALL RESISTORS RATED 1/2 WATT ± 10% UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS WITH DECIMAL VALUES ARE IN MFD. AND ARE PAPER CAPACITORS 400 W.V.D.C. UNLESS OTHERWISE SPECIFIED.
3. ALL CAPACITORS WITH WHOLE NUMBER VALUES ARE IN MMF. AND ARE CERAMIC, 500 W.V.D.C. UNLESS OTHERWISE SPECIFIED.
4. ALL D.C. VOLTAGES TO BE MEASURED WITH A V.T.V.M OF 11 MEGOHM INPUT RESISTANCE OR BETTER AND WITH A LINE VOLTAGE OF 117 V.A.C. 60 CYCLES
5. MEASURED VOLTAGE SHOULD BE WITHIN ± 10% OF INDICATED VOLTAGE.
6. UPPER VOLTAGE READINGS ARE TAKEN WITH SWITCH IN RECORD POSITION AND LOWER READINGS ARE TAKEN WITH SWITCH IN PLAYBACK POSITION.

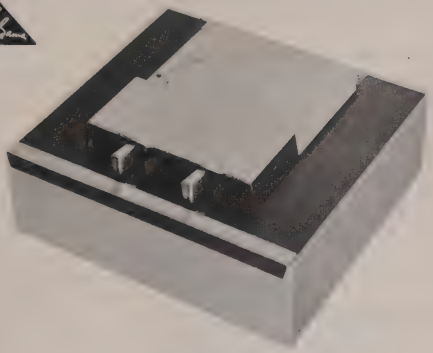
WEBCOR MODEL 2103

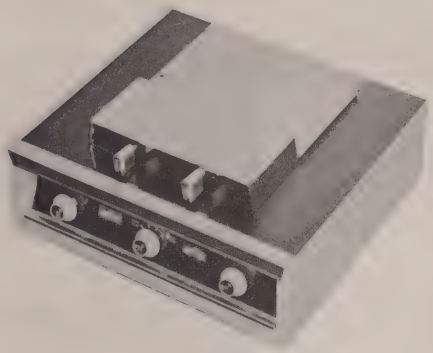
Schematic Diagram Courtesy of Webcor, Inc.

PHOTOFACT® Folder with CIRCUITRACE®

BELL SOUND MODELS
401, 402, 403, 404, 405, 406

BELL SOUND MODELS
401, 402, 403, 404, 405, 406





BELL SOUND MODELS
401, 402, 403, 404, 405, 406

GENERAL INFORMATION

Bell Model 401 is a Stereo-Pak cartridge tape transport mechanism. It is connected directly into the tape-head inputs of a stereo amplifier.

Bell Model 402 has a dual playback preamplifier. Thus, a stereo tape cartridge can be played back into any stereo amplifier or combination of two amplifiers.

Bell Model 403 is a Stereo-Pak cartridge tape recorder with a built-in transistor record-playback preamplifier. This unit is connected to a stereo amplifier or two separate amplifiers.

Bell Model 404 is a Stereo-Pak cartridge tape player. The preamplifier and amplifier are enclosed within the case.

Bell Models 405 and 406 are complete stereo cartridge tape recorders. Both models contain a 14-watt stereo amplifier and a transistorized record-playback preamplifier. The only difference between these two models is the case. All units have one tape speed — 3 3/4 ips. They should be connected to an outlet supplying 110 - 120 volts, 60 cycles AC only.

Manufactured by:

Bell Sound Division
Thompson Ramo Wooldridge, Inc.
555 Marion Road
Columbus 7, Ohio

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

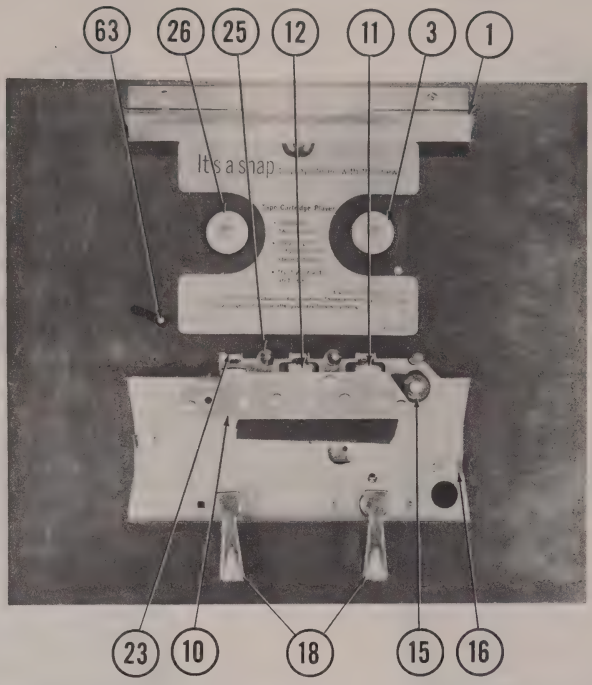


FIG.1 TOP VIEW OF MECHANISM WITH HEAD COVER REMOVED

PREPARING FOR OPERATION

1. Place the unit on a level surface.
2. Make all necessary connections. "See Typical Hookup" under the appropriate model.
3. Plug the AC cord into an outlet of proper rating.

TYPICAL HOOKUP

Model 401

Plug the head leads into the tape-head inputs of any stereo amplifier.

Model 402

Plug the output leads of the stereo tape cartridge player into the auxiliary, radio, or other high-level inputs of a stereo amplifier or combination of amplifiers.

A high-fidelity system can be used as one channel, and a radio, phonograph, or TV set, as the other channel.

Model 403

1. Plug the outputs of the Stereo-Pak into the auxiliary, radio, or high-level inputs of a stereo amplifier or combination of amplifiers.
2. Plug the auxiliary inputs of the Stereo-Pak into the record outputs of a stereo amplifier.
3. To make live recordings, connect low-impedance microphones to the microphone inputs.
4. To transfer a stereo disc to a tape cartridge, connect a record player with a stereo magnetic cartridge to the Stereo-Pak Mag Phono inputs.
5. Connect a stereo radio tuner to the auxiliary inputs for recording stereo radio programs directly on a tape cartridge.

Model 404, 405, and 406

1. Plug the cables from the left and right speakers into their respective speaker terminals on the

rear panel.

2. Connect a record changer or turntable with a magnetic stereo cartridge to the Mag Phono inputs.

3. Connect a stereo radio tuner to the auxiliary inputs.

4. On Models 405, and 406 only, connect low-impedance microphones to the microphone inputs.

5. Plug power cords of the tuner and record player into the auxiliary AC receptacles on rear panel of Stereo-Pak.

FUNCTION OF TAPE-DECK CONTROLS

On-Off

Turning this control to the left turns the power on; to the right, turns the power off.

Operating Lever

Turn this control to Play to play back a tape cartridge; to Fast to move the tape rapidly to any desired selection. To rewind tape, turn the cartridge over, and place the lever in the Fast position.

FUNCTION OF AMPLIFIER CONTROLS

Models 403 and 404

1. Set the Selector switch to the desired function.
2. Adjust the Left and Right Volume controls until the sound from each channel is balanced.
3. (Model 404 only) Adjust the Bass and Treble controls to the desired listening level. The tone is controlled in both speakers simultaneously.

Models 405 and 406

1. Set the Selector switch to the desired function.
2. Adjust the Left and Right Volume controls until the sound from each channel is balanced.
3. Adjust the Bass and Treble controls to the desired listening level. The tone is controlled in both speakers simultaneously.
4. The Monitor Volume control (on the back panel) regulates the volume of the power amplifiers. Turn this control off during all live microphone recordings, but leave it fully on during all other operations.

OPERATING INSTRUCTIONS

NOTE: See "Typical Hookup" for proper connections.

Loading the Tape Cartridge

Place the back of the cartridge under the retainer flange. While pressing the cartridge against the flange, push the front down firmly into position.

To Play a Recording

1. Load the cartridge (see "Loading the Tape Cartridge").
2. Move the On-Off switch to the On position.
3. On Models 401 and 402, move the Operating Lever to Play.
4. On Models 403, 404, 405, and 406, turn the Selector switch to the Tape position; then move the Operating Lever to Play.
5. Adjust the Volume controls to the desired sound level.
6. On Models 404, 405, and 406, adjust the Bass and Treble controls to the desired settings.

NOTE: The Bass and Treble controls affect the playback response only.

To Play a Phonograph — Models 403, 404, 405, and 406

1. Turn the Selector switch to the Phono position.
2. Turn the On-Off switch to On.
3. Load the phonograph with stereo records.
4. Adjust the Volume and the Bass and Treble controls to the desired sound level.

To Play a Stereo Tuner — Models 403, 404, 405, and 406

1. Turn the Selector switch to the Aux position.
2. Turn the On-Off switch to On.
3. Tune the tuner to the desired program.
4. On Models 404, 405, and 406, adjust the volume

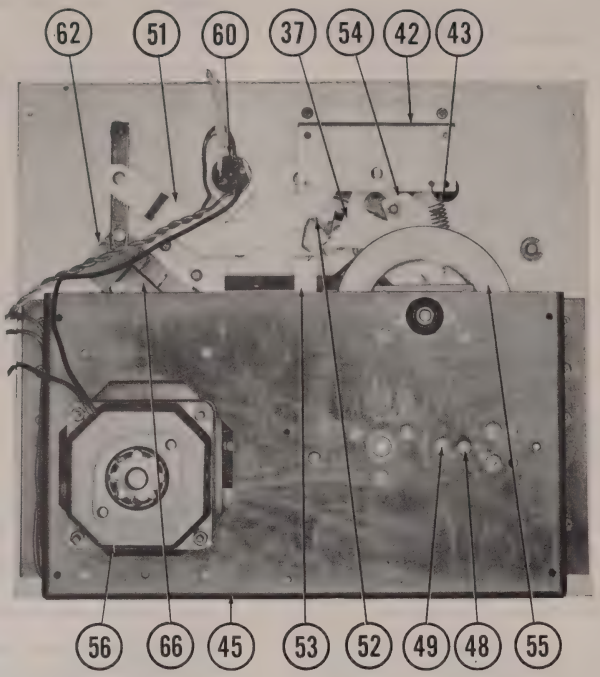


FIG. 2 BOTTOM VIEW OF MECHANISM

and the Bass and Treble controls to the desired sound level.

Fast Forward

Move the Operating Lever to Fast to advance the tape rapidly to a desired selection.

Rewind

To rewind a tape, turn the tape cartridge over, and move the Operating Lever to Fast.

NOTE: Always return the Operating Lever to neutral before loading or unloading a cartridge.

To Make a Stereo Recording — Models 403, 405, and 406

1. Set the Selector switch to correspond to the source being recorded (phonograph, stereo radio tuner, or microphone).
2. Load a blank tape cartridge into the unit.
3. Adjust the Left and Right Volume controls until the Volume Level meters fluctuate in the upper part of the black scales.
4. Move the Operating Lever to Play.

NOTE: Always set the Selector switch to Tape Play before setting the Operating Lever to Fast.

5. After a recording has finished in one direction, it can be kept permanently, by breaking out the plastic insert between the two small slots (on the back of the cartridge, to the right of the guide slot). Repeat this procedure after recording in the other direction.

To Erase a Prerecorded Tape Cartridge — Models 403, 405, and 406

1. Cover the open slot of the tape cartridge with a double thickness of cellophane tape.
2. If a new recording is to be made, proceed as described under "To Make a Stereo Recording".
3. If no recording is to be made, turn the Selector switch to the Phono, Aux, or Microphone position; then rotate the Volume controls fully counterclockwise, and move the Operating Lever to Play.

Splicing the Tape

1. Remove the two screws at the front of the cartridge.

2. Remove the top half of the shell and the Mylar sheet.
3. Pull the brake lever forward to free the hubs, and unwind a few inches of tape.
4. Butt the broken ends together, and apply the splicing tape to the glossy side of the recorded tape.
5. Trim the tape slightly narrower at the splice.
6. When reassembling, insert the rear edges together first.

DISASSEMBLY

Removing Model 402 From Cabinet

1. Remove the screws holding the bottom pan onto the cabinet.
2. Remove the pan.
3. Remove the screws holding the tape transport to the rails in the cabinet.
4. Lift the unit from the cabinet.
5. To reassemble, reverse this procedure.

Removing Model 403 Tape Transport and Preamplifier From Cabinet

1. Remove the control knobs on the front of the unit.
2. Remove the hex nut from the Selector switch.
3. Remove the screws holding the pan to the bottom of the cabinet.
4. Move the pan to one side, and disconnect the power plug.
5. Remove the head cover.
6. Disconnect the head leads.
7. Remove the pan and preamplifier from cabinet.
8. Remove the screws holding the tape transport to the side rails of the cabinet.
9. Lift the tape transport from the cabinet.
10. To reassemble, reverse this procedure.

Removing Models 404 and 405 From Cabinet

1. Remove the tube guard on the rear of the unit.
2. Remove the tubes.
3. Remove the screws from the bottom of the cabinet.
4. Remove the bronze screws extending through the back of the cabinet into the mechanism.
5. Lift the unit from the cabinet.
6. To reassemble, reverse this procedure.

Removing Amplifier From Tape Transport Mechanism – Model 404

1. Remove the control knobs.
2. Remove the hex nuts from the left-and right-channel Volume controls and the Selector switch.
3. Remove the small escutcheon and the spaces over the control shafts.
4. Remove the large escutcheon.
5. Disconnect the motor leads from the AC supply.
6. Disconnect the AC supply from the On-Off switch.
7. Remove the two screws from the bracket (on right side) holding the tape transport to the amplifier.
8. Remove the two screws, one on each side, holding the front escutcheon to the front escutcheon to the tape transport.
9. Remove the two screws from the bottom of the amplifier pan holding the bracket (on left side of tape transport) to the amplifier pan.
10. Remove the leads to the playback head.
11. Lift the tape transport from the amplifier.
12. To reassemble, reverse this procedure.

To Remove Preamplifier and Amplifier From Tape Transport Mechanism – Models 405 and 406

1. Remove the control knobs.
2. Remove the hex nuts from the left-and right-channel Volume controls and Selector switch.
3. Remove the small escutcheon and spacers over the control shafts.
4. Remove the Record Level Indicator meters and the large escutcheon.
5. Disconnect the motor leads from the AC supply.
6. Disconnect the AC supply from the On-Off switch.
7. Disconnect the leads to the erase and record-playback heads.
8. Remove the two screws from the bracket (on right side) holding the tape transport to the bottom pan.

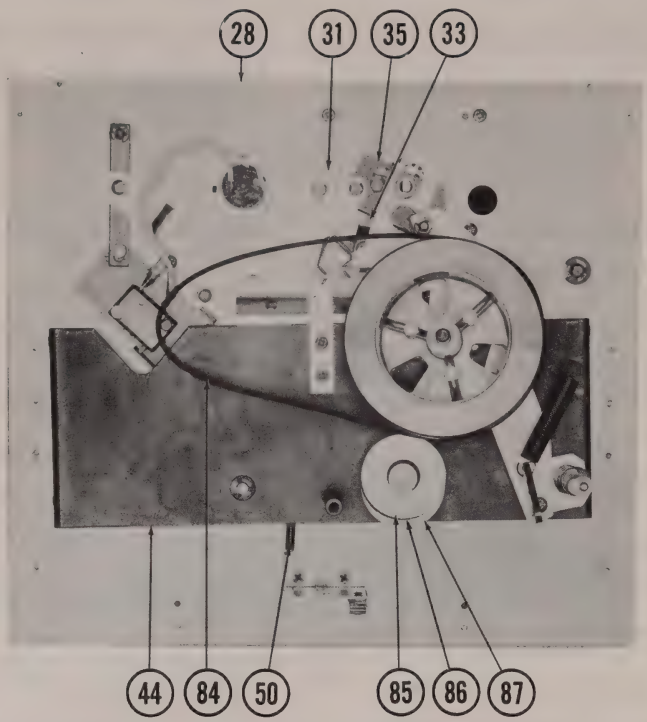


FIG.3 BOTTOM VIEW OF MECHANISM WITH BOTTOM OF SUB DECK REMOVED

9. Remove the two screws, one on each side, holding the front escutcheon to the tape transport.

10. Remove the two screws from the bottom of the pan holding the bracket (on left side of tape transport) to the amplifier pan.

11. Lift the tape transport from the amplifier pan.

12. To reassemble, reverse this procedure.

MECHANICAL ADJUSTMENTS

Clutch

To vary the friction of the clutch on second production models, tighten clutch adjusting screw (48) until the torque is 6 inch-ounces, and loosen clutch plate mounting and adjusting screw (49) until the torque is 3 inch-ounces. On first production models, loosen the locknut, and adjust the screw for a torque of 3 inch-ounces.

Play - Record Head (See Exploded View, Item 11)

1. Loosen the locking nuts on the sides of the heads. Adjust the vertical position of the erase and record/ play heads until the top edge of the tape is even with the top edge of the lamination of the head.

2. To adjust the horizontal position, turn head adjusting screw (8) to the right or left.

Play-Record Head (See Exploded View, Item 96)

1. Slightly loosen the two head mounting nuts.

2. Place the unit in Playback, and connect an ACVTVM to the outputs.

3. Play back a test-tape cartridge and raise or lower the head bracket, by means of the bent-out tab at the rear, until maximum output is obtained from the right channel.

4. Check the left-channel output.

5. Tighten the head mounting nuts.

6. Play back the 7.5- or 15- kc portion of the test tape, and set the Azimuth adjustment for maximum output from the right channel.

CLEANING

Pressure roller (15) should be wiped with a dry cloth. Clean record playback heads (11), erase head (12), the capstan shaft, and the brass tape guides with a good head-cleaning solvent.

LUBRICATION

All bearings are Oilite and should therefore require no further lubrication. All sliding levers should be lubricated with a clinging type of grease.

TROUBLE CHART

Symptom	Cause	Remedy
No drive in record or playback.	1. Clutch drive belt (88) broken or off the pulleys.	1. Replace clutch drive belt (88), or put it back on the pulleys.
	2. Clutch out of adjustment.	2. See "Clutch Adjustment".
	3. Clutch top disc (85) or rubber clutch disc (87) worn.	3. Replace clutch top disc (85) or rubber clutch disc (87).
	4. Defective drive motor (56).	4. Replace drive motor (56).
No record or playback.	1. Defective record/ playback head (11).	1. Replace record/ playback head (11).
	2. Defective component in amplifier.	2. Check values in schematic.
Wow or flutter.	1. Dirty or oily capstan, pressure roller (15), flywheel (55), motor pulley (81), or clutch plate (86).	1. Clean these parts with a good solvent, except pressure roller (15), which should be wiped with a dry cloth.
	2. Clutch out of adjustment.	2. See "Clutch Adjustment".
	3. Clutch top disc (85) or rubber clutch disc (87) worn.	3. Replace clutch top disc (85) or rubber clutch disc (87).
Will not shut off automatically.	1. Auto stop switch (66) defective.	1. Replace auto stop switch (66).
One channel reproducing weakly or not at all during playback, or may play back in reverse occasionally.	1. Cartridge not properly seated on tape deck.	1. Make sure the cartridge is seated properly so the tape will follow the tape guides and contact the head correctly.
	2. Tape pulls up and out of the guides.	2. Excessive take-up clutch tension. To remedy, see "Clutch Adjustment".
	3. Pressure pad spring (23) bent, so that the pressure pads are not contacting the tape squarely.	3. Bend pressure pad spring (23) until the pressure pads engage the head squarely in the center.
	4. Pressure roller (15) shaft bent.	4. Straighten the shaft until pressure roller (15) contacts the capstan evenly.
	5. Cartridge damaged.	5. Replace cartridge.

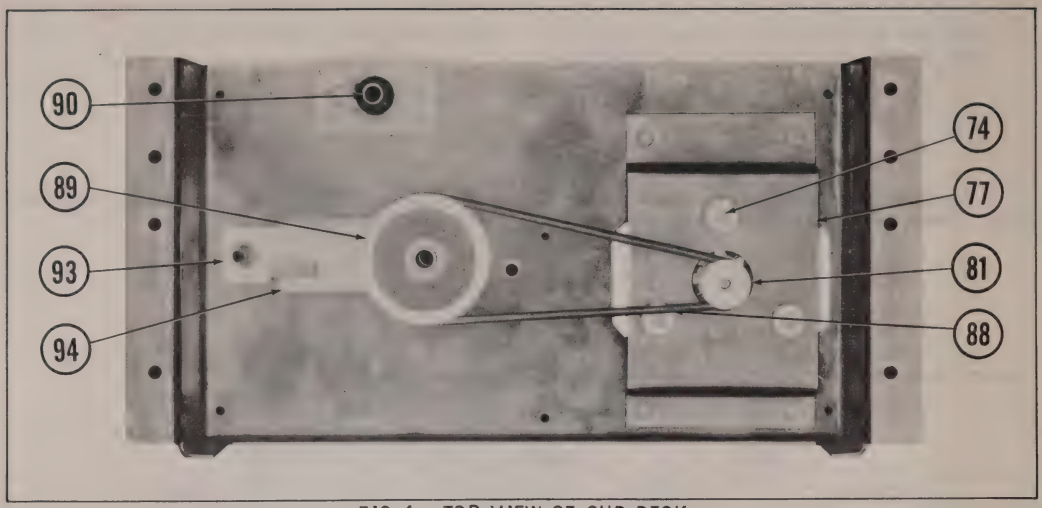


FIG.4 TOP VIEW OF SUB DECK

TROUBLE CHART (CON'T.)

Symptom	Cause	Remedy
Intermittent blank spots on recorded tape.	1. Dirty heads and tape guides. 2. Fingerprints on oxide side of tape.	1. See "Cleaning". 2. Cut out this section, and splice the tape.
Noisy preamplifier.	1. Defective transistors, usually in the first and second stages.	1. Replace any defective transistors.
Record meter reads when no signal is applied and unit is in Record with a blank cartridge inserted.	1. Defective blue-dot meter transistor.	1. Replace the blue-dot meter transistor.
Insufficient erase and record bias.	1. Defective bias-oscillator transistor.	1. Replace bias-oscillator transistor.
Weak bass response on Models 403, 404, and 405.	1. High-impedance microphone being used.	1. For proper sound, a low-impedance microphone must be used.

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1		Cartridge Retainer Screws	11	36B10	Record/ Playback Head
2	78B164	Cartridge Retainer		36B9	Playback Head
3	75B67	Take-up Reel Platform	12	36B11	Erase Head
4	77A19	Reel Platform Index Spring	13		Tension Spring
5	75A64	Index Pin	14	67X8	Retaining Ring - 3/16"
6	76A19	Take-up Shaft	15	83A39	Pressure Roller
7	78B106	Head Cover	16	66A19	Head-Cover Retaining Clip
8		Head Adjusting Screw	17		Set Screw, Allen Cup Point
9		Head Mounting Plate Screws	18	73A4	Function Selector Knob & On-Off Knob
10	91B242	Head Mounting Plate Ass'y-Models 401, 402, 404	19		Hex Nut
10	91B243	Head Mounting Plate Ass'y-Models 403, 405, 406	20	72D332	Deck Cover
			21	78B165	Front Frame Strip-Model 402

MECHANICAL PARTS LIST (CON'T.)

Ref. No.	Part No.	Description
22	75A57	Head-Plate Mtg. Stud
23	77A38	Pressure Pad Spring
24	75A75	Head-Plate Center Stud
25	75A60	Tape Guide Post
26	91A254	Feed-Reel Shaft Ass'y
27	75A63	Brake Release Pin
28	71D47	Deck Plate
29	91B211	Selector Shaft
30		Flat Washer
31	91A384	Pressure-Pad Actuator Ass'y
32		Screw
33	72A239	Pressure-Pad Actuator Link
34		Screw
35	71A54	Index Cam
36		Roller
37	72C232	Pressure Roller Actuator
38	63A20	Flat Phenolic Washer
39	67X6	Retaining Ring
40	75A70	Selector Shaft Spacer
41		Screw
42	72B247	Selector Support Bracket
43	77A31	Clutch Fork Spring
44	Part of Item 45	Subdeck Top Plate
45	72B242	Subdeck
46		Subdeck Mounting Screws
47		Clutch-Plate Mounting Screws
48		Clutch Adjusting Screw
49		Clutch-Plate Mounting & Adjusting Screw
50	77A30	Pressure-Pad Return Spring
51	71A46	Auto-Stop Actuator
52	77A36	Pressure-Roller Toggle Spring
53		Pressure-Roller Toggle-Spring Bracket
54	72A245	Bottom Clutch-Actuator Cam
55	73B5	Flywheel
56	35C13	Drive Motor-Models 404, 405, 406
	35C12	Drive Motor-Models 401, 402, 403
57	91A270	Fan-Models 404, 405, 406
58	91A269	Switch Bracket Assembly
59		Mounting Screws
60	43B52	On-Off Switch

Ref. No.	Part No.	Description
61	75A46	Auto Stop Pivot Stud
62	72A236	Auto Stop Plate
63	72A401	Auto Stop Arm
64	67X5	Retaining Ring
65		Screw
66	43A53	Auto Stop Switch
66A	63A19	Phenolic Washer
67		4-40 Hex Nut
68	72B235	Auto Stop Link
69		Screw
70	67X8	Retaining Ring
71	74A6	Feed Reel Bearing
72	63A40	Reel Platform Shims
73	67A10	Push-on Fastener
74		#6-32 x 9/16 Screw
75		#6 Flat Washer
76		Motor Mounting-Plate Screw
77	72B371	Motor Support Bracket
78		Subdeck Top Plate Screws
79	64A28	Motor-Mounting Spacer Eyelet
80		Motor Mounting Spacer
81		Motor Pulley
82	71A48	Clutch Plate
83		Set Screw
84 *	83A40 *	* Flywheel Drive Belt
85	75A65	Clutch Top Disc
86	71A48	Clutch Plate
87	83A54	Rubber Clutch Disc
88 *	83A41 *	* Clutch Drive Belt
89	75A85	Clutch Pulley
90	74A8	Self-aligning Bearing
91	75A59	Subdeck Support Post
92	74A8	Self-aligning Bearing
93	72A372	Clutch Fork
94	72A234	Actuator Clutch Pivot Bracket
95	91A238	Platform Bearing Assembly
96		Head Mounting Bracket Ass'y.
97		Bracket Mounting Screw
98	91A432	Head Nest Assembly
99	77A5	Spring
100		Azimuth Adjust Screw

* Flywheel Drive Belt, Walsco Part No. 1410-18.
* Clutch Drive Belt, Walsco Part No. 1410-12.

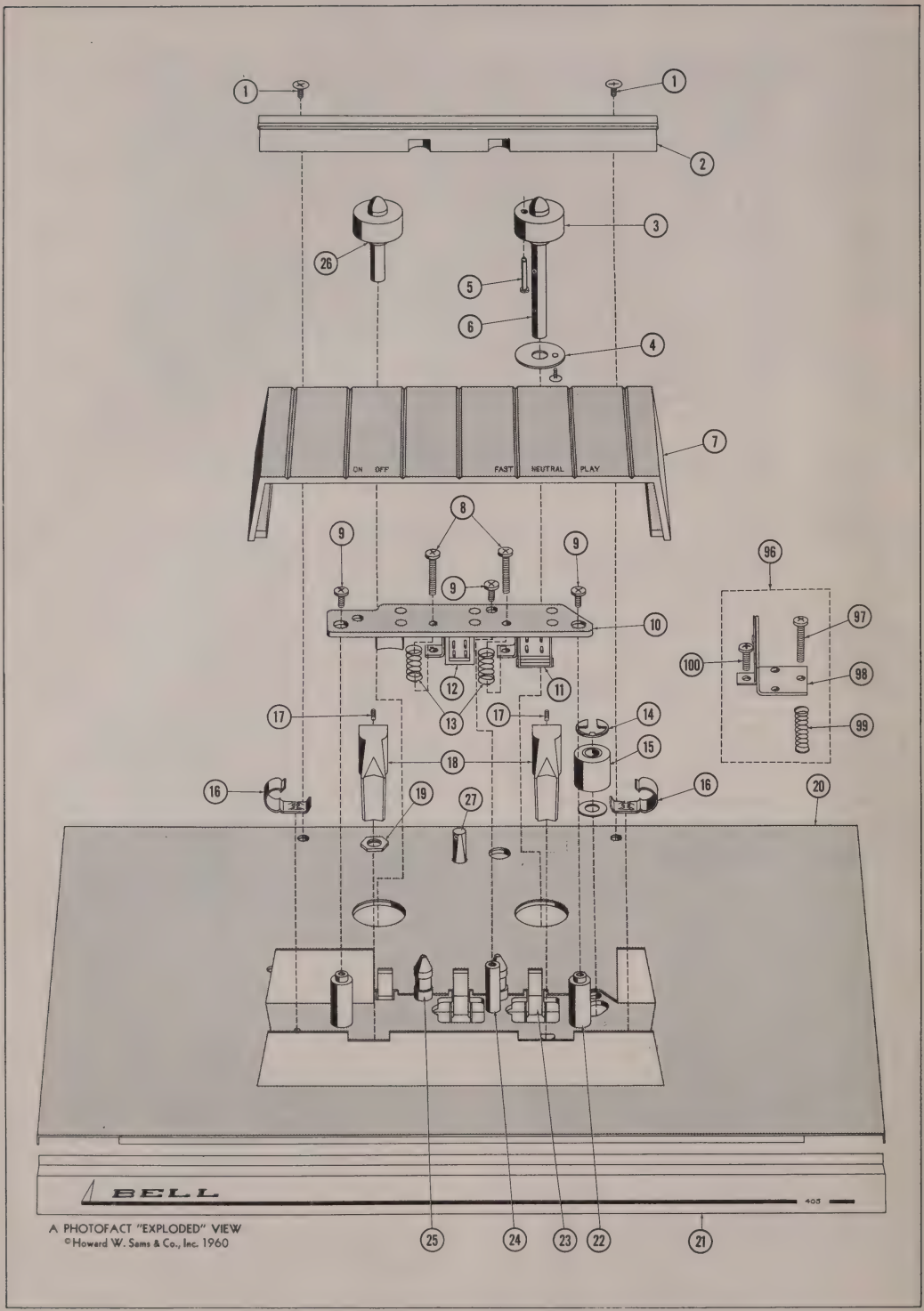


FIG.5A EXPLODED VIEW OF PARTS ABOVE DECK COVER

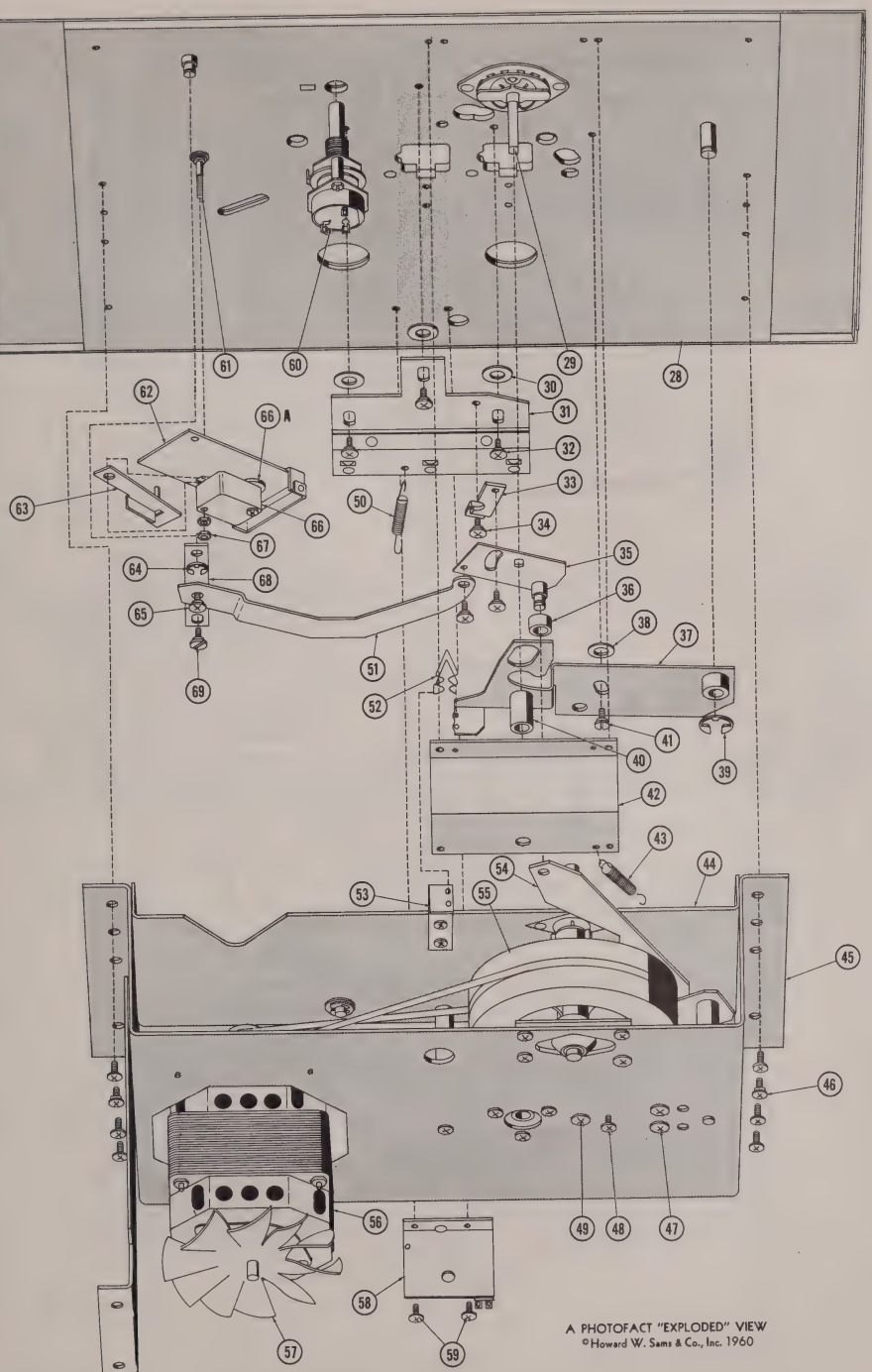


FIG.5B EXPLODED VIEW OF PARTS BELOW DECK PLATE

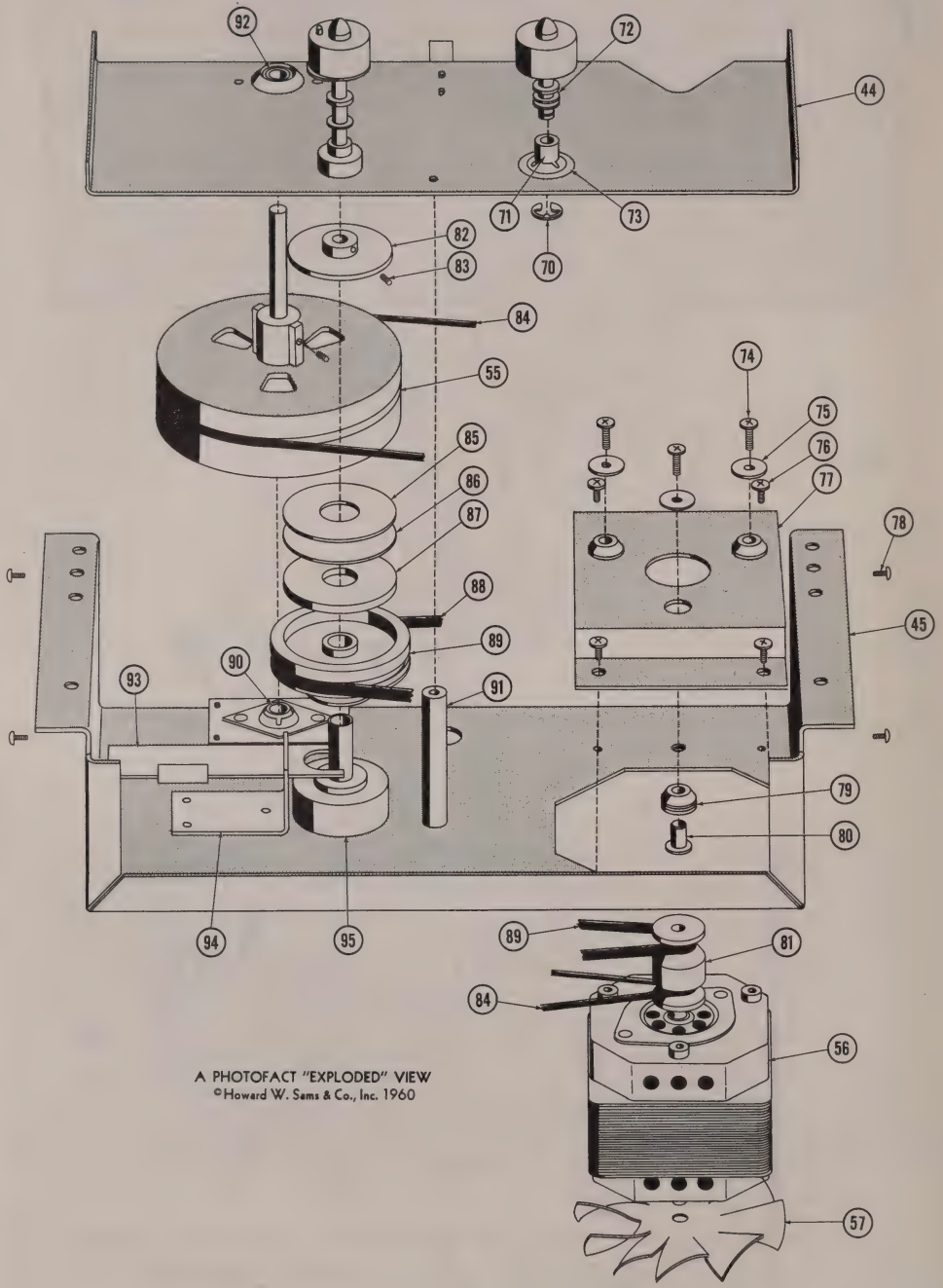
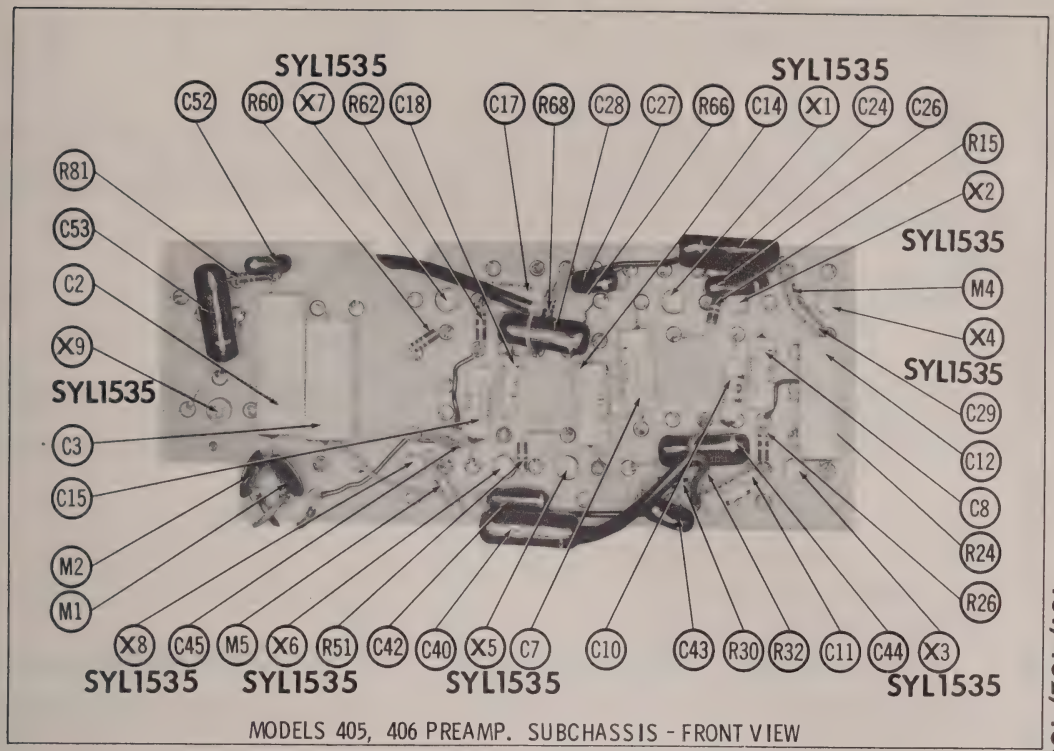
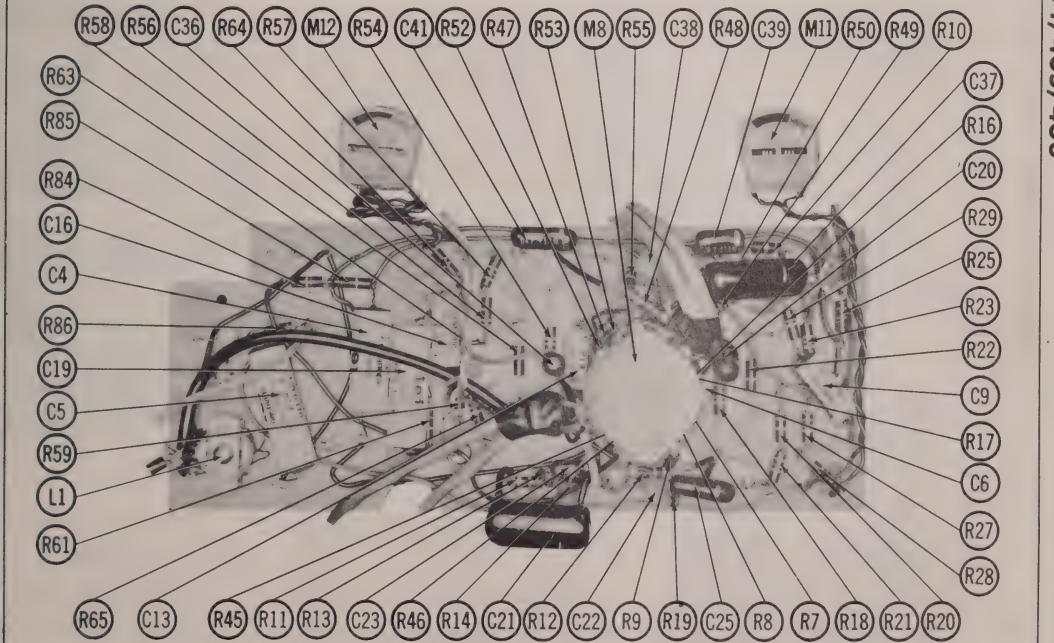


FIG. 5C EXPLODED VIEW OF PARTS BELOW SUB DECK TOP PLATE



MODELS 405, 406 PREAMP. SUBCHASSIS - FRONT VIEW



MODELS 405, 406 PREAMP. SUBCHASSIS - REAR VIEW

MODELS 405 AND 406 AMP PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (GENERAL ELECTRIC • RAYTHEON • SYLVANIA)	ITEM No.	USE	TYPE (GENERAL ELECTRIC • RAYTHEON • SYLVANIA)
V1	Left Channel AF Amp.	ECC83/12AX7	V5	Right Channel AF Amp.	ECC83/12AX7
V2	Left Channel Phase Inv.	ECC82/12AU7	V6	Right Channel Output	6AQ5A
V3	Left Channel Output	6AQ5A	V7	Right Channel Output	6AQ5A
V4	Left Channel Output	6AQ5A	V8	Rectifier	EZ81

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA: RCA PART No.	REPLACEMENT DATA: RAYTHEON PART No.	REPLACEMENT DATA: SYLVANIA PART No.	NOTES
X1	SYL-1535	Left Channel Preamp.			SYL-1535	PNP
X2	SYL-1535	Left Channel 1st AF Amp.			SYL-1535	PNP
X3	SYL-1535	Left Channel 2nd AF Amp.			SYL-1535	PNP
X4	SYL-1535	Left Channel Meter Amp.			SYL-1535	PNP
X5	SYL-1535	Right Channel Preamp.			SYL-1535	PNP
X6	SYL-1535	Right Channel 1st AF Amp.			SYL-1535	PNP
X7	SYL-1535	Right Channel 2nd AF Amp.			SYL-1535	PNP
X8	SYL-1535	Right Channel Meter Amp.			SYL-1535	PNP
X9	SYL-1535	Bias Oscillator			SYL-1535	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: BELL SOUND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	40	350	23B47	PR4-200	BBRQ0174	WQ795 *	TDLD-31	TVAS-3745 *	
B	40	300					TD-40-450		
C	40	300							
C2	400	15	23B54	PRS1220	BR5001	TC1505	TD-500-15	TVAS-1161.5 *	
C3	200	15	23B55	PRS1210	NLW200-15	TC1502	TD-250-15	TE-1164	
C4	100	15	23B56	PWE25100	NLW100-15	TT15X100	ML100-15	TE-1162	
C5	200	12	23B70	SRE12V200	NLW200-12	TC1502	TD-250-15	TE-1137	
C6	25	10	23B60	PWE10025	NLW25-10	TT10X25	ML30-15	TE-1118	
C7	100	10	23B58	PWE10100	NLW100-12	TT15X100	ML100-15	TE-1119.3	
C8	50	10	23B59	PWE10050	NLW50-10	TT10X50	ML50-15	TE-1119	
C9	50	10	23B59	PWE10050	NLW50-10	TT10X50	ML50-15	TE-1119	
C10	10	10	23B61	PWE10010	NLW10-15	TT12X10	ML10-15	TE-1114	
C11	10	10	23B61	PWE10010	NLW10-15	TT12X10	ML10-15	TE-1114	
C12	200	12	23B70	SRE12V200	NLW200-12	TC1502	TD-250-15	TE-1137	
C13	25	10	23B60	PWE10025	NLW25-10	TT10X25	ML30-15	TE-1118	
C14	100	10	23B58	PWE10100	NLW100-12	TT15X100	ML100-15	TE-1119.3	
C15	50	10	23B59	PWE10050	NLW50-10	TT10X50	ML50-15	TE-1119	
C16	50	10	23B59	PWE10050	NLW50-10	TT10X50	ML50-15	TE-1119	
C17	10	10	23B61	PWE10010	NLW10-15	TT12X10	ML10-15	TE-1114	
C18	10	10	23B61	PWE10010	NLW10-15	TT12X10	ML10-15	TE-1114	
C19	200	12	23B70	SRE12V200	NLW200-12	TC1502	TD-250-15	TE-1137	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C20	.01 50V 10%		V84C2S1-10%		PM4S1	1DP-1-103	GEM-1611	4TM-S1
C21	.47 50V 10%		V84C2P47-10%		PM2P47	2DP-5-474	GEM-2047	2TM-P47
C22	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C23	.01 50V 10%		V84C2S1-10%		PM4S1	1DP-1-103	GEM-1611	4TM-S1
C24	.33 50V 10%		V84C2P33-10%		PM2P33	2DP-5-334	GEM-2033	2WF-P33
C25	.047 50V 10%		V84C2S47-10%		PM2S47	1DP-2-473		2TM-S47
C26	.047 50V 10%		V84C2S47-10%		PM2S47	1DP-2-473		2TM-S47
C27	.0082 50V 10%		P684CM-0082			6DP-2-822	GEM-16282	5BF-D82
C28	.22 50V 10%		V84C2P22-10%		PM2P22	1DP-3-224	GEM-2022	2TM-P22
C29	2200 10%		DI-2200		PM6D22	CCD-222	GP222	10TS-D22
C30	.033 100V 10%		V84C2S33-10%		PM4S33	1DP-2-333		6TM-S33
C31	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C32	2.2 NPO .25mmf		NPO-DI 2.2	DTZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C33	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C34	68 NPO		NPO-DI 68	DTZ-68	C10Q68C	CCTO-680	CNO-468	10TCC-Q68
C35	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C36	.01 50V 10%		V84C2S1-10%		PM4S1	1DP-1-103	GEM-1611	4TM-S1

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C37	.47 50V 10%		V84C2P47-10%		PM2P47	2DP-5-474	GEM-2047	2TM-P47
C38	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C39	.01 50V 10%		V84C2S1-10%		PM4S1	1DP-1-103	GEM-1611	4TM-S1
C40	.33 50V 10%		V84C2P33-10%		PM2P33	2DP-5-334	GEM-2033	2WF-P33
C41	.047 50V 10%		V84C2S47-10%		PM2S47	1DP-2-473		2TM-S47
C42	.047 50V 10%		V84C2S47-10%		PM2S47	1DP-2-473		4TM-S47
C43	.0082 50V 10%		P684CM-0082			6DP-1-822	GEM-16282	5BF-D82
C44	.22 50V 10%		V84C2P22-10%		PM2P22	1DP-3-224	GEM-2022	2TM-P22
C45	2200 10%		DI-2200		PM6D22	CCD-222	GP222	10TS-D22
C46	.033 100V 10%		V84C2S33-10%		PM4S33	1DP-2-333		6TM-S33
C47	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C48	2.2 NPO .25mmf		NPO-DI 2.2	DTZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C49	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C50	68 NPO		NPO-DI 68	DTZ-68	C10Q68C	CCTO-680	CNO-468	10TCC-Q68
C51	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C52	.022 50V 10%		V84C2S22-10%		PM4S22	1DP-1-223		2TM-S22
C53	.33 50V 10%		V84C2P33-10%		PM2P33	2DP-5-334	GEM-2033	2WF-P33

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: BELL SOUND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	100K	1/2	15B64					Left Volume Note 1
R2A	2meg	1/2	15B65	B-76	AD47-2meg-2		FA26A	Bass, Right Channel Note 2
B	2meg	1/2		SR-76	Not Req.		RU26A	Bass, Left Channel
C	Shaft			Not Req.	FS-3		CS3500	
R3A	2meg	1/2	15B66	B-76	AD47-2meg-2		FA26A	Treble, Right Channel Note 2
B	2meg	1/2		SR-76	Not Req.		RU26A	Treble, Left Channel
C	Shaft			Not Req.	FS-3		CS3500	
R4	100K	1/2	15B64					Right Volume Note 1
R5A	100K	1/2	15B62	B-41			FA15A	Monitor Volume, Left Chan.
B	100K	1/2		SR-41			RU15A	Monitor Volume, Right Chan.
C	Shaft			Not Req.			CS3500	
R6A	250Ω	1/2	15B35	B-2		B11-201		Hum Balance
B	Shaft			Not Req.		TM4		

Note 1. Model 406 uses Part #15B73. Some versions may use 500K in this application.
Note 2. In some versions, R2 and R3 part numbers are reversed.

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R7	4700Ω	
R8	100K	
R9	22Ω	
R10	39Ω	
R11	39Ω	
R12	5600Ω	
R13	470Ω	
R14	270Ω	
R15	100K	
R16	220K	
R17	18K	
R18	22K	
R19	47Ω	
R20	6800Ω	
R21	560Ω	
R22	2200Ω	
R23	27K	
R24	68K	
R25	1800Ω	
R26	3900Ω	
R27	18K	
R28	22K	
R29	22K	
R30	3900Ω	
R31	220K	
R32	68K	
R33	100K	

ITEM No.	RATING	REMARKS
R34	2200Ω	
R35	270K	
R36	1000Ω	
R37	22K	(15K) *
R38	1meg	
R39	47K	
R40	2200Ω	
R41	47K	
R42	470K	
R43	180Ω 1W	
R44	470K	
R45	4700Ω	
R46	100K	
R47	22Ω	
R48	5600Ω	
R49	470Ω	
R50	270Ω	
R51	100K	
R52	220K	
R53	18K	
R54	22K	
R55	47Ω	
R56	6800Ω	
R57	560Ω	
R58	2200Ω	
R59	27K	
R60	68K	

ITEM No.	RATING	REMARKS
R61	1800Ω	
R62	3900Ω	
R63	18K	
R64	22K	
R65	22K	
R66	3900Ω	
R67	220K	
R68	68K	
R69	100K	
R70	2200Ω	
R71	270K	
R72	1000Ω	
R73	22K	(15K) *
R74	1meg	
R75	47K	
R76	2200Ω	
R77	47K	
R78	470K	
R79	180Ω 1W	
R80	470K	
R81	15K	
R82	250Ω 5W	IRC #PW5-250Ω
R83	15K	
R84	220Ω	
R85	1000Ω	
R86	68Ω	

*Alternate Value

MODELS 405 AND 406 AMP PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		BELL SOUND PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	
L1	Osc. Coil	31A33				①

① Alternate Part #31A48.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	BELL SOUND PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	117V	6.3V @ 3.5A	22VCT @ .035A	32B71					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	BELL SOUND PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6800Ω CT	6-8Ω	32B74	A-2901	A-3823	24S06	S-53X	
T3	6800Ω CT	6-8Ω	32B74	A-2901	A-3823	24S06	S-53X	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	BELL SOUND PART No.	REPLACEMENT DATA
K1	Tone Compensator	220mmf, 1000mmf, 2000mmf, 5000mmf, 22K, 47K, 220K	91A196	
K2	Tone Compensator	220mmf, 1000mmf, 2000mmf, 5000mmf, 22K, 47K, 220K	91A196	

POWER RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	BELL SOUND PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.035A	42A6	1N1763	40K	SR500	Silicon Type
M2	.035A	42A6	1N1763	40K	SR500	Silicon Type

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			BELL SOUND PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3	3AG	2A 250V	53A9	53A8	312002 (3AG 2A 250V)	342007	AGC 2	HKP

SIGNAL DIODES

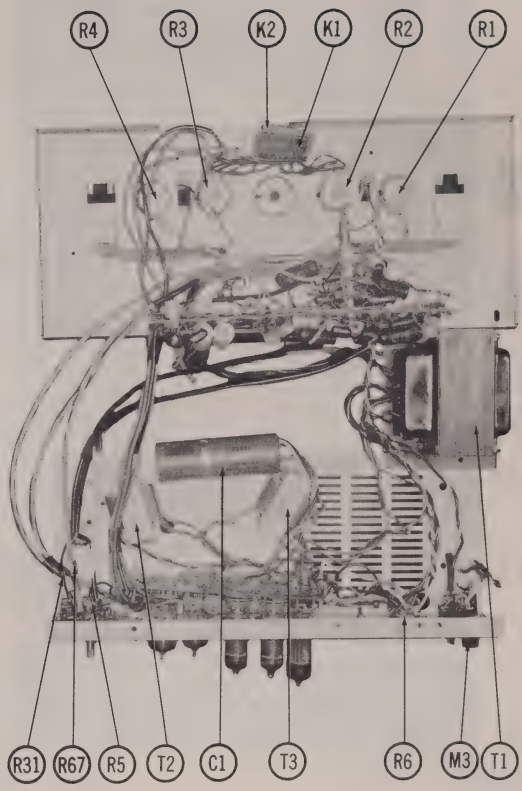
ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		BELL SOUND PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M4	1N60	42X3		1N60	1N60	Base, Meter Amp. (Left Channel)
M5	1N60	42X3		1N60	1N60	Base, Meter Amp. (Right Channel)

MISCELLANEOUS

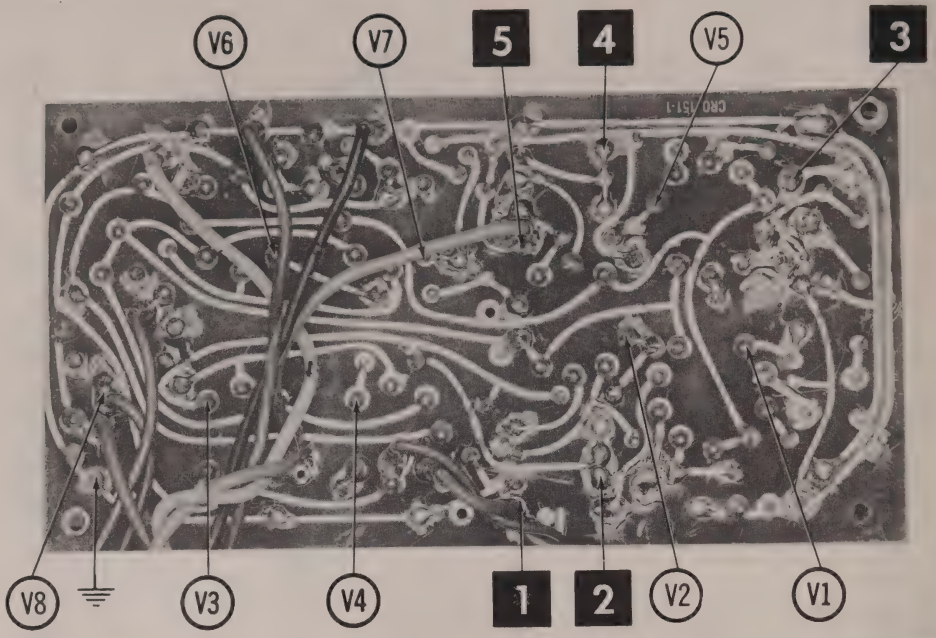
ITEM No.	PART NAME	BELL SOUND PART No.	NOTES
M6	Head	36B10	Playback
M7	Head	36B11	Erase
M8	Switch	43B74	Function Selector
M9	Switch	43B52	Off-On
M10	Switch	43A53	Auto Stop
M11	Meter	46B5	Record Level Indicator (Left Channel)
M12	Meter	46B5	Record Level Indicator (Right Channel)

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



MODELS 405, 406 CHASSIS BOTTOM VIEW



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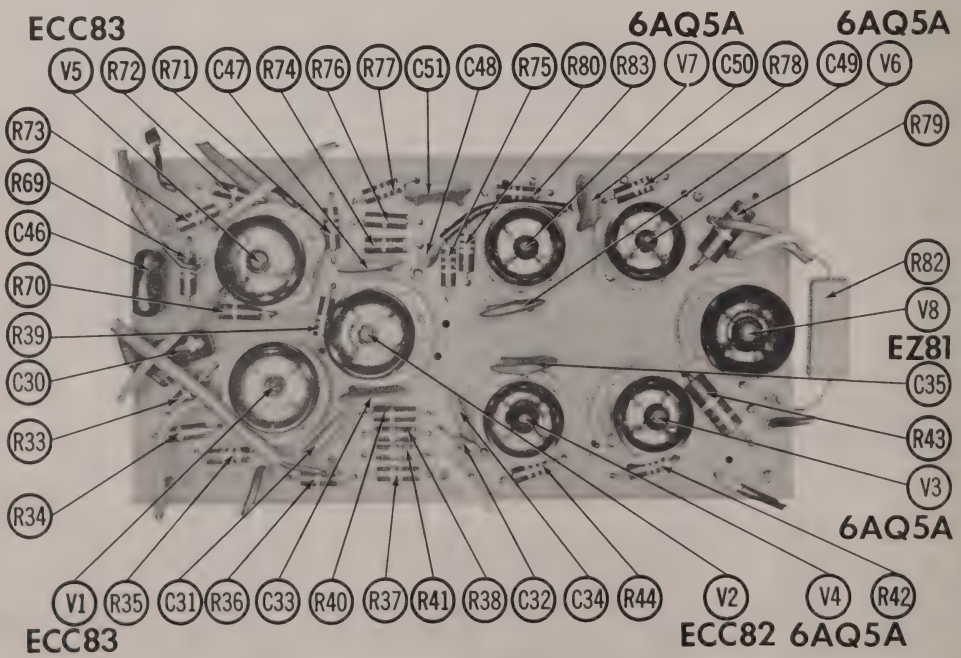
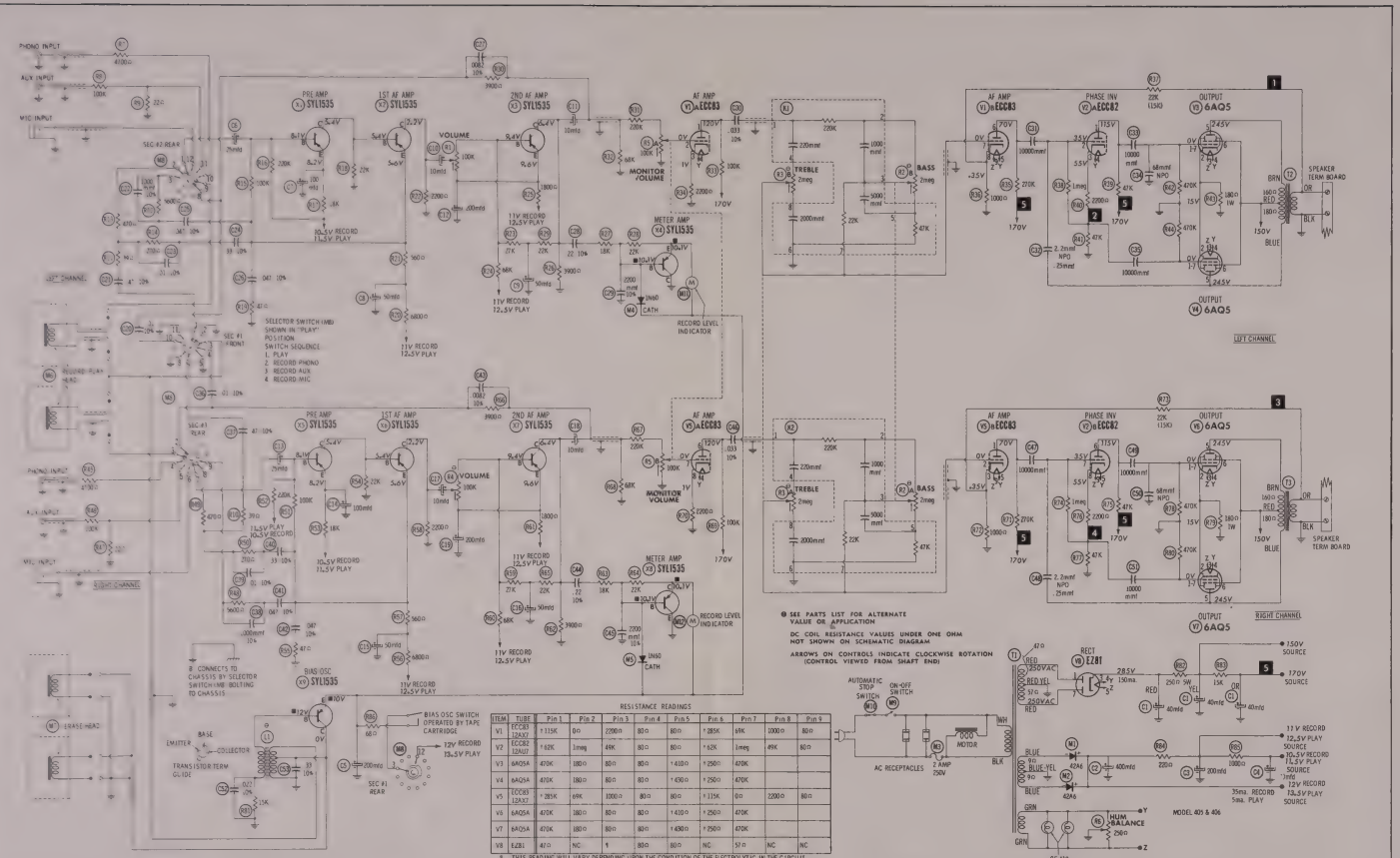
MODEL 405, 406 OUTPUT-POWER PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



MODEL 405, 406 OUTPUT-POWER PRINTED BOARD



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83 12AX7	*115K	0Ω	2200Ω	80Ω	80Ω	*285K	69K	1000Ω	80Ω
V2	ECC82 12AU7	*62K	1meg	49K	80Ω	80Ω	*62K	1meg	49K	80Ω
V3	6AQ5A	470K	180Ω	80Ω	80Ω	*410Ω	*250Ω	470K		
V4	6AQ5A	470K	180Ω	80Ω	80Ω	*430Ω	*250Ω	470K		
V5	ECC83 12AX7	*285K	69K	1000Ω	80Ω	80Ω	*115K	0Ω	2200Ω	80Ω
V6	6AQ5A	470K	180Ω	80Ω	80Ω	*410Ω	*250Ω	470K		
V7	6AQ5A	470K	180Ω	80Ω	80Ω	*430Ω	*250Ω	470K		
V8	EZ81	47Ω	NC	¶	80Ω	80Ω	NC	5Ω	NC	NC

* THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
¶ MEASURED FROM PIN 3 OF V8. NC NO CONNECTION
RESISTANCE MEASUREMENTS NOT GIVEN FOR X1 THRU X9 BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.
■ MEASURED IN RECORD POSITION.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
CIRCUITRACE
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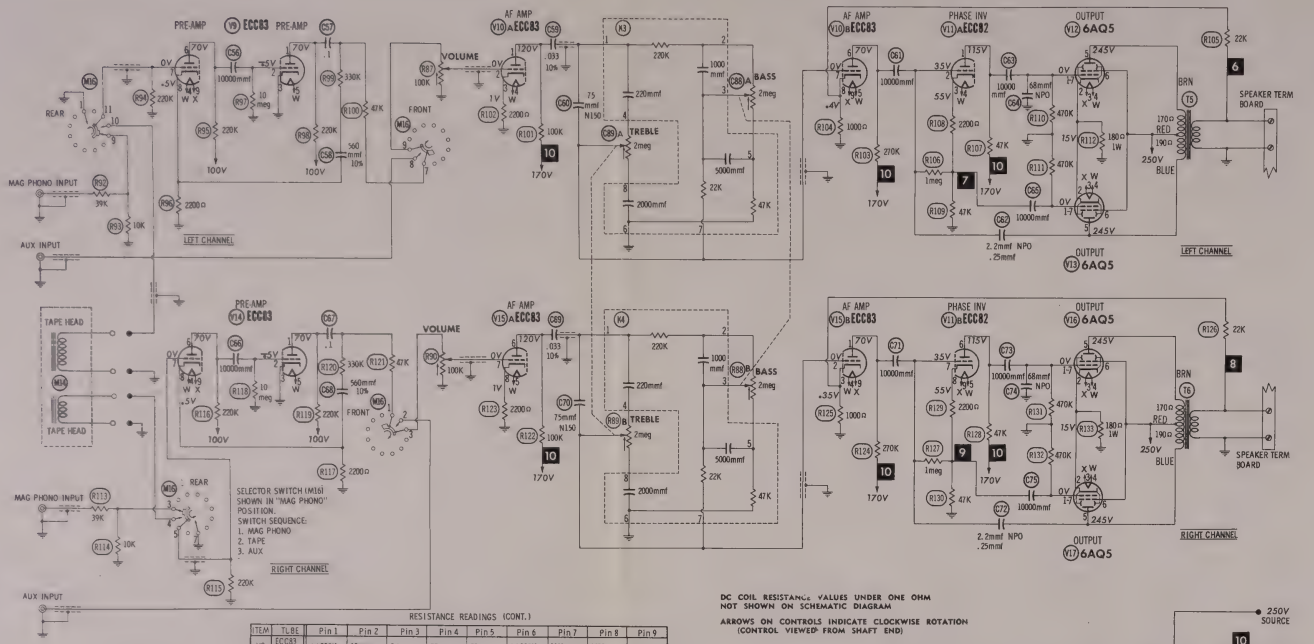
MODELS 405, 406



RESISTANCE READINGS (CONT.)

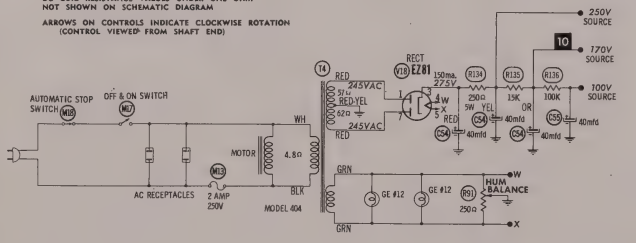
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V9	ECC83 12AX7	††335K	10meg	0Ω	55Ω	55Ω	††335K	10K	2200Ω	55Ω
V10	ECC83 12AX7	††115K	0Ω	2200Ω	55Ω	55Ω	††285K	49K	1000Ω	55Ω
V11	ECC82 12AU7	††62K	1meg	49K	55Ω	55Ω	††62K	1meg	49K	55Ω
V12	6AQ5A	470K	180Ω	55Ω	55Ω	††420Ω	††250Ω	470K		
V13	6AQ5A	470K	180Ω	55Ω	55Ω	††440Ω	††250Ω	470K		
V14	ECC83 12AX7	††335K	10meg	0Ω	55Ω	55Ω	††335K	10K	2200Ω	55Ω
V15	ECC83 12AX7	††285K	69K	1000Ω	55Ω	55Ω	††115K	0Ω	2200Ω	55Ω
V16	6AQ5A	470K	180Ω	55Ω	55Ω	††420Ω	††250Ω	470K		
V17	6AQ5A	470K	180Ω	55Ω	55Ω	440Ω	††250Ω	470K		
V18	EZ81	57Ω	NC	¶	55Ω	55Ω	NC			

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
†† MEASURED FROM PIN 3 OF V18. NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)



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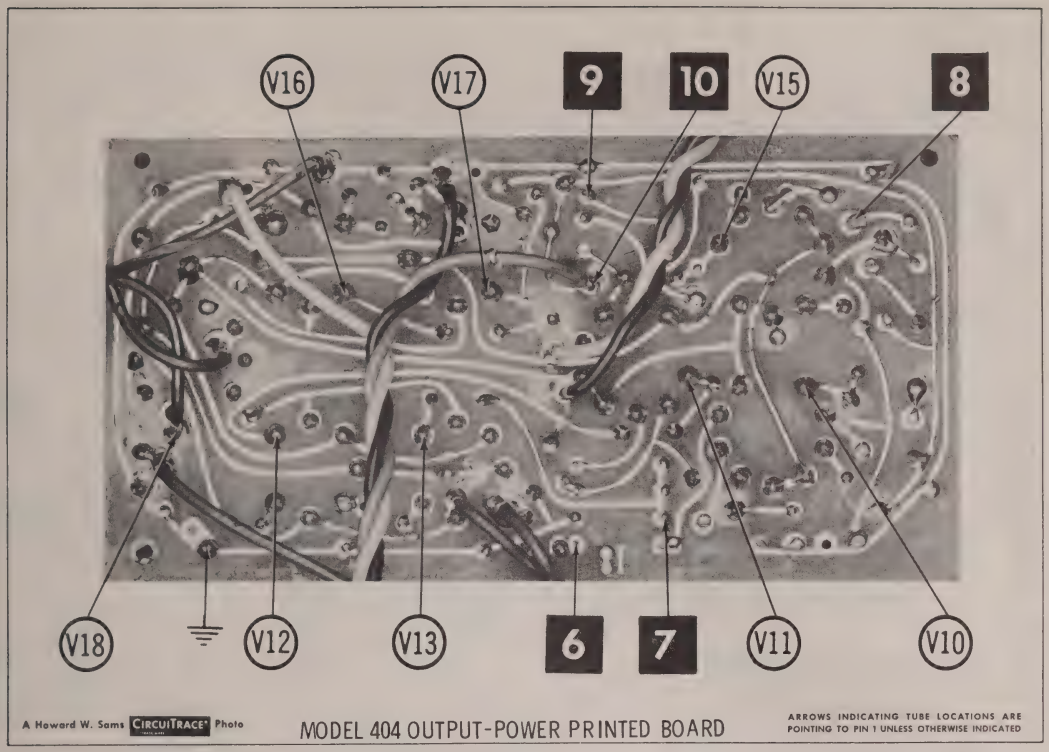
BELL SOUND MODELS
401, 402, 403, 404, 405, 406

MODEL 404



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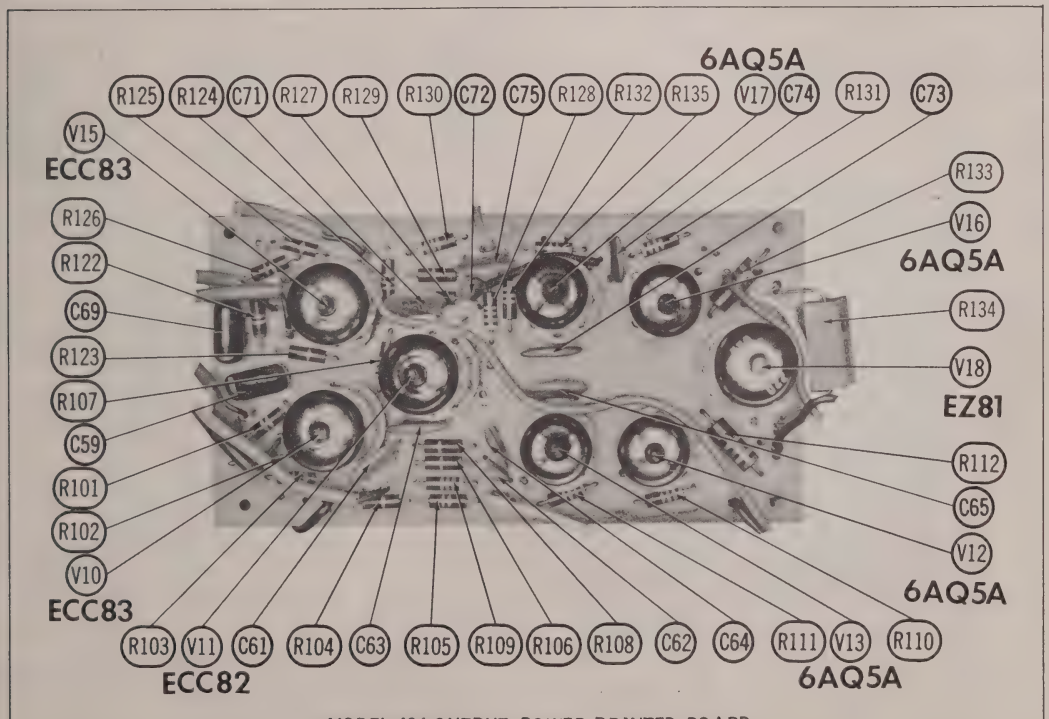
MODEL 404 OUTPUT-POWER PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



MODEL 404 OUTPUT-POWER PRINTED BOARD

FOLDER 4

MODEL 404 AMP PARTS LIST AND DESCRIPTIONS

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)

TUBES

◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V9	Left Channel Preamp.	ECC83/12AX7
V10	Left Channel AF Amp.	ECC83/12AX7
V11	Left Channel Phase Inv.	ECC82/12AU7
V12	Left Channel Output	6AQ5A
V13	Left Channel Output	6AQ5A
V14	Right Channel Preamp.	ECC83/12AX7
V15	Right Channel AF Amp.	ECC83/12AX7
V16	Right Channel Output	6AQ5A
V17	Right Channel Output	6AQ5A
V18	Rectifier	EZ81

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA BELL SOUND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C54A	40	350	23B47	PR4-200	BBRQ0174	WQ795	TDLD-31	TVAS-3745 *	
B	40	300					TD40-450		
C	40	300							
C55	40	300	23A52	PRS1670	BR4035	TC78	TD40-350	TVA-1611	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C56	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C57	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C58	560 10%		DI-560	DD-561	1R5T56	CCD-561	GP356	10TS-T56
C59	.033 100V 10%		V84C2S33-10%		PM4S33	1DP-2-333		6TM-S33
C60	75 N150	#24A28				*		
C61	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C62	2.2 NPO .25mmf		NPO-DI 2.2	DTZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C63	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C64	68 NPO		NPO-DI 68	DTZ-68	C10Q68C	CCTO-680	CNO-468	10TCC-Q68
C65	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C66	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C67	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C68	560 10%		DI-560	DD-561	1R5T56	CCD-561	GP356	10TS-T56
C69	.033 100V 10%		V84C2S33-10%		PM4S33	1DP-2-333		6TM-S33
C70	75 N150	#24A28				*		
C71	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C72	2.2 NPO .25mmf		NPO-DI 2.2	DTZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C73	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C74	68 NPO		NPO-DI 68	DTZ-68	C10Q68C	CCTO-680	CNO-468	10TCC-Q68
C75	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10

* Not normally in distributors stock. Available thru distributor on order to manufacturer.
# Bell Sound Part Number.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA BELL SOUND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R87	100K		15B78					Left Volume
R88A	2meg		15B55					Bass, Left Channel
B	2meg							Bass, Right Channel
R89A	2meg		15B56					Treble, Left Channel
B	2meg							Treble, Right Channel
R90	100K		15B78					Right Volume
R91A	250Ω		15B35	B-2		B11-201		Hum Balance
B	Shaft			Not Req.		TM4		

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R92	39K	
R93	10K	
R94	220K	
R95	220K	
R96	2200Ω	
R97	10meg	
R98	220K	
R99	330K	
R100	47K	
R101	100K	
R102	2200Ω	
R103	270K	
R104	1000Ω	
R105	22K	
R106	1meg	
R107	47K	
R108	2200Ω	
R109	47K	
R110	470K	
R111	470K	
R112	180Ω 1W	
R113	39K	
R114	10K	
R115	220K	
R116	220K	
R117	2200Ω	
R118	10meg	
R119	220K	
R120	330K	
R121	47K	
R122	100K	
R123	2200Ω	
R124	270K	
R125	1000Ω	
R126	22K	
R127	1meg	
R128	47K	
R129	2200Ω	
R130	47K	
R131	470K	
R132	470K	
R133	180Ω 1W	
R134	250Ω 5W	IRC #PW5-250Ω
R135	15K	
R136	100K	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	BELL SOUND PART No.	REPLACEMENT DATA
K3	Tone Compensator	220mmf, 1000mmf, 2000mmf, 5000mmf, 22K, 47K, 220K	91A196	
K4	Tone Compensator	220mmf, 1000mmf, 2000mmf, 5000mmf, 22K, 47K, 220K	91A196	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA BELL SOUND PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T4	117V@ .8A	490VCT @ .15A	6.3V@ 4.5A	32B72					

TRANSFORMER (AUDIO OUTPUT)

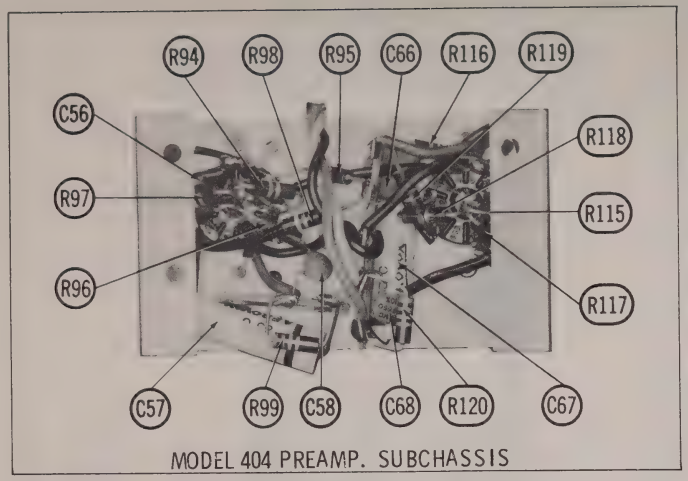
ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA BELL SOUND PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T5	6800Ω CT	6-8Ω	32B74	A-2901	A-3823	24S06	S-53X	
T6	6800Ω CT	6-8Ω	32B74	A-2901	A-3823	24S06	S-53X	

FUSES

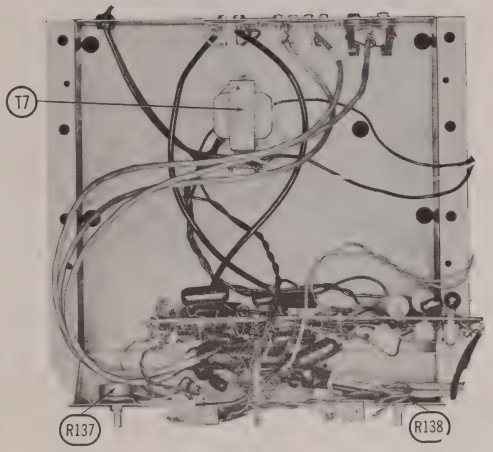
ITEM No.	TYPE	RATING	REPLACEMENT DATA BELL SOUND PART No. FUSE	BELL SOUND PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M13	3AG	2A 250V	53A9	53A8	312002 (3AG 2A 250V)	342007	AGC 2	HKP

MISCELLANEOUS

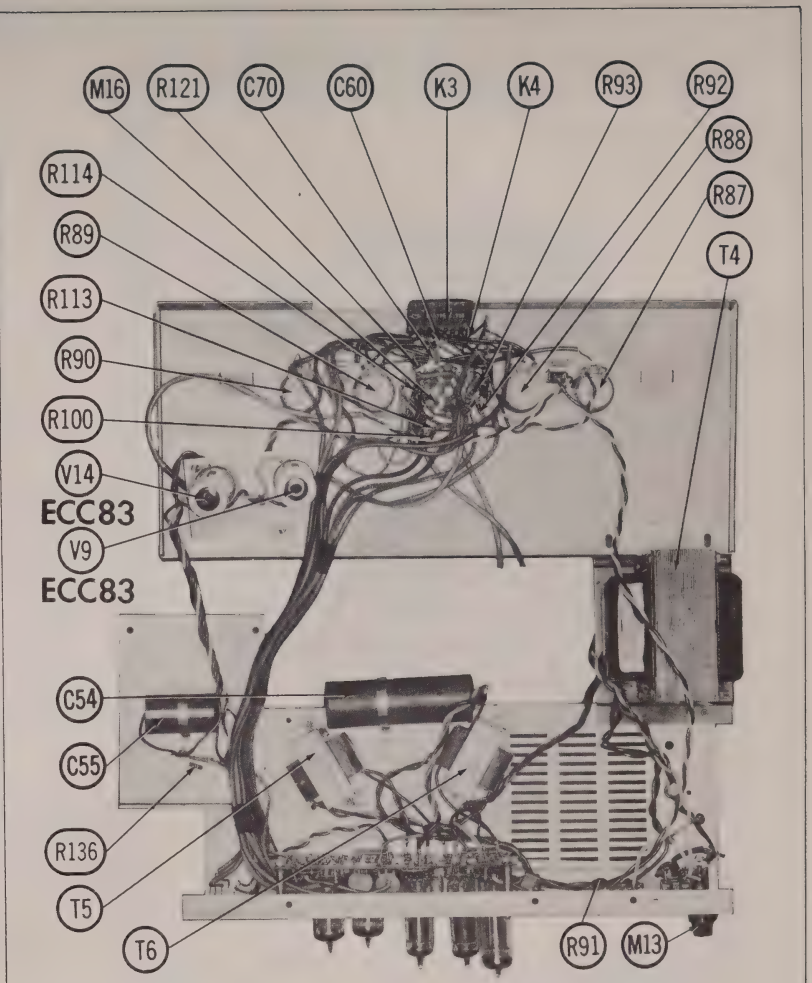
ITEM No.	PART NAME	BELL SOUND PART No.	NOTES
M14	Head	36B9	Playback
M15	Head	72A284	Dummy
M16	Switch	43B55	Function
M17	Switch	43B52	Off-On
M18	Switch	43A53	Automatic Stop



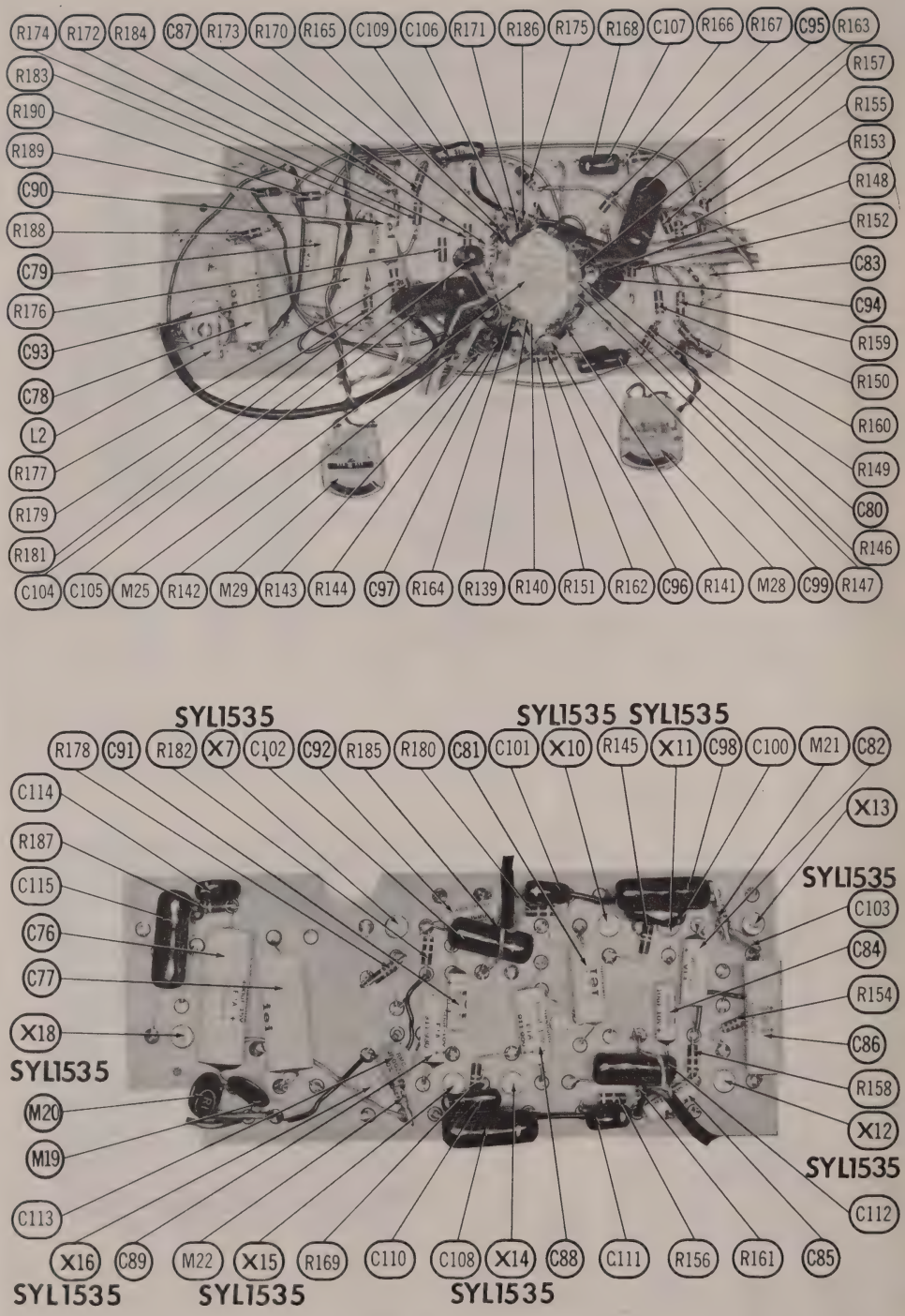
MODEL 404 PREAMP. SUBCHASSIS



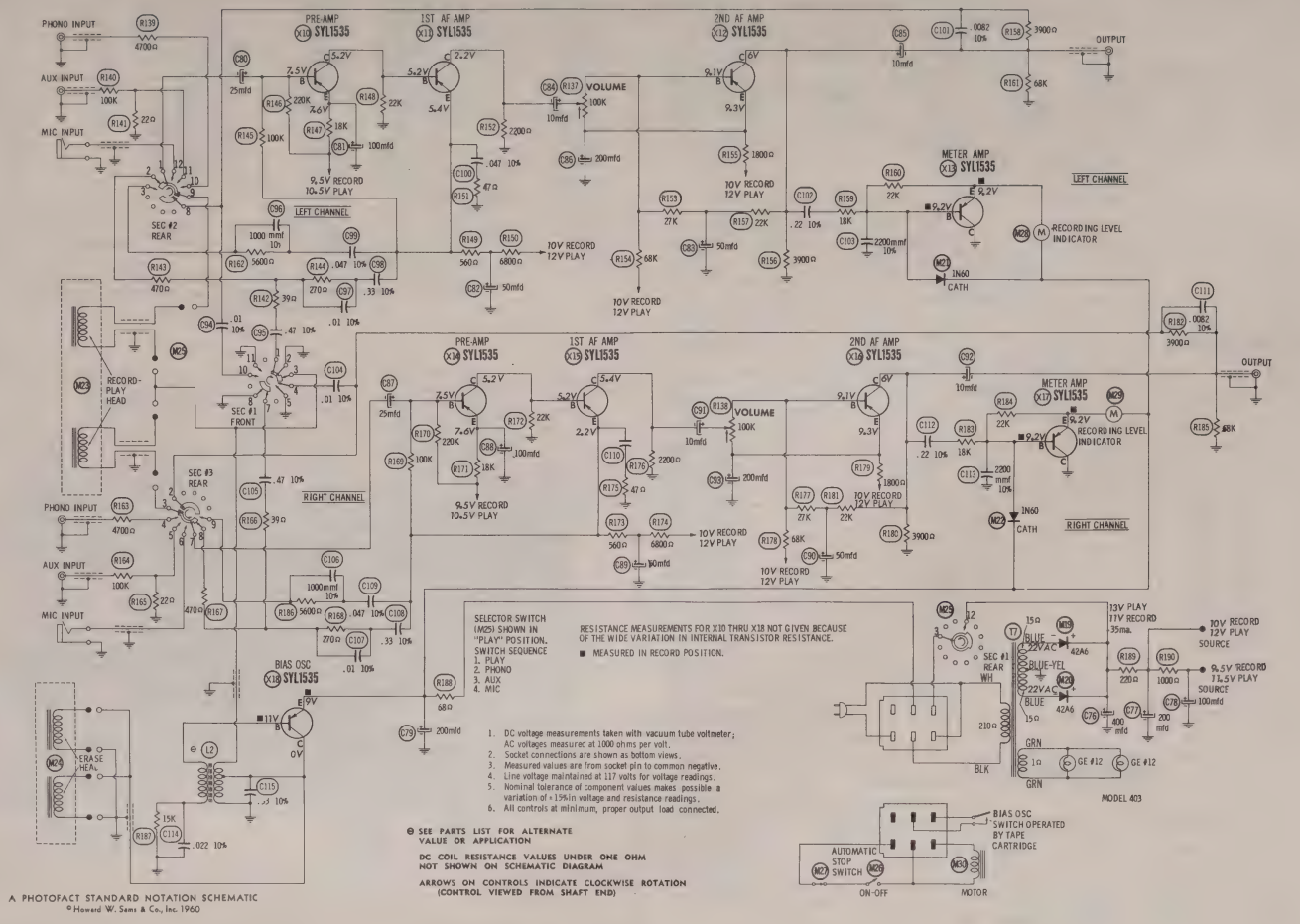
MODEL 403 BOTTOM VIEW



MODEL 404 CHASSIS - TOP VIEW



MODEL 403 SUB-CHASSIS


PHONO INPUT
AUX INPUT
MIC INPUT
PRE-AMP X10 SYL1535
1ST AF AMP X11 SYL1535
2ND AF AMP X12 SYL1535
VOLUME
OUTPUT
METER AMP X13 SYL1535
LEFT CHANNEL
RECORDING LEVEL INDICATOR
9.5V RECORD 10.5V PLAY
10V RECORD 12V PLAY
SEC #2 REAR
SEC #1 FRONT
SEC #3 REAR
RECORD-PLAY HEAD
RIGHT CHANNEL
PRE-AMP X14 SYL1535
1ST AF AMP X15 SYL1535
2ND AF AMP X16 SYL1535
METER AMP X17 SYL1535
BIAS OSC X18 SYL1535
ERASE HEAD
SELECTOR SWITCH (M25) SHOWN IN "PLAY" POSITION. SWITCH SEQUENCE 1. PLAY 2. PHONO 3. AUX 4. MIC
RESISTANCE MEASUREMENTS FOR X10 THRU X18 NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.
■ MEASURED IN RECORD POSITION.
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.
⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
13V PLAY 11V RECORD 35ma.
10V RECORD 12V PLAY SOURCE
9.5V RECORD 11.5V PLAY SOURCE
MODEL 403
BIAS OSC SWITCH OPERATED BY TAPE CARTRIDGE
AUTOMATIC STOP SWITCH
ON-OFF
MOTOR

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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MODEL 403

BELL SOUND MODELS 401, 402, 403, 404, 405, 406

MODEL 403 AMP PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA: RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
X10	SYL1535	Left Channel Preamp.			SYL1535	PNP
X11	SYL1535	Left Channel 1st AF Amp.			SYL1535	PNP
X12	SYL1535	Left Channel 2nd AF Amp.			SYL1535	PNP
X13	SYL1535	Left Channel Meter Amp.			SYL1535	PNP
X14	SYL1535	Right Channel Preamp.			SYL1535	PNP
X15	SYL1535	Right Channel 1st AF Amp.			SYL1535	PNP
X16	SYL1535	Right Channel 2nd AF Amp.			SYL1535	PNP
X17	SYL1535	Right Channel Meter Amp.			SYL1535	PNP
X18	SYL1535	Bias Oscillator			SYL1535	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: BELL SOUND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C76	400	15	23B54	PRS1220	BR5001	TC1505	TD-500-15	TVAS-1161.5*	
C77	200	15	23B55	PRS1210	NLW200-15	TC1502	TD-250-15	TE-1164	
C78	100	15	23B56	PWE25100	NLW100-15	TT15X100	ML100-15	TE-1162	
C79	200	12	23B70	SRE12V200	NLW200-12	TC1502	TD-250-15	TE-1137	
C80	25	10	23B60	PWE10025	NLW25-10	TT10X25	ML30-15	TE-1118	
C81	100	10	23B58	PWE10100	NLW100-12	TT15X100	ML100-15	TE-1119.3	
C82	50	10	23B59	PWE10050	NLW50-10	TT10X50	ML50-15	TE-1119	
C83	50	10	23B59	PWE10050	NLW50-10	TT10X50	ML50-15	TE-1119	
C84	10	10	23B61	PWE10010	NLW10-15	TT12X10	ML10-15	TE-1114	
C85	10	10	23B61	PWE10010	NLW10-15	TT12X10	ML10-15	TE-1114	
C86	200	12	23B70	SRE12V200	NLW200-12	TC1502	TD-250-15	TE-1137	
C87	25	10	23B60	PWE10025	NLW25-10	TT10X25	ML30-15	TE-1118	
C88	100	10	23B58	PWE10100	NLW100-12	TT15X100	ML100-15	TE-1119.3	
C89	50	10	23B59	PWE10050	NLW50-10	TT10X50	ML50-15	TE-1119	
C90	50	10	23B59	PWE10050	NLW50-10	TT10X50	ML50-15	TE-1119	
C91	10	10	23B61	PWE10010	NLW10-15	TT12X10	ML10-15	TE-1114	
C92	10	10	23B61	PWE10010	NLW10-15	TT12X10	ML10-15	TE-1114	
C93	200	12	23B70	SRE12V200	NLW200-12	TC1502	TD-250-15	TE-1137	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C94	.01 50V 10%		V84C2S1-10%		PM4S1	1DP-1-103	GEM-1611	4TM-S1
C95	.47 50V 10%		V84C2P47-10%		PM2P47	2DP-5-474	GEM-2047	2TM-P1
C96	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C97	.01 50V 10%		V84C2S1-10%		PM4S1	1DP-1-103	GEM-1611	4TM-S1
C98	.33 50V 10%		V84C2P33-10%		PM2P33	2DP-5-334	GEM-2033	2WF-P33
C99	.047 50V 10%		V84C2S47-10%		PM2S47	1DP-2-473		2TM-S47
C100	.047 50V 10%		V84C2S47-10%		PM2S47	1DP-2-473		2TM-S47
C101	.0082 50V 10%		P684CM-0082			6DP-1-822	GEM-16282	5BF-D82
C102	.22 50V 10%		V84C2P22-10%		PM2P22	6DP-3-224	GEM-2022	2TM-P22
C103	2200 10%		DI-2200		PM6D22	CCD-222	GP222	10TS-D22
C104	.01 50V 10%		V84C2S1-10%		PM4S1	1DP-1-103	GEM-1611	4TM-S1
C105	.47 50V 10%		V84C2P47-10%		PM2P47	2DP-5-474	GEM-2047	2TM-P47
C106	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C107	.01 50V 10%		V84C2S1-10%		PM4S1	1DP-1-103	GEM-1611	4TM-S1
C108	.33 50V 10%		V84C2P33-10%		PM2P33	2DP-5-334	GEM-2033	2WF-P33
C109	.047 50V 10%		V84C2S47-10%		PM2S47	1DP-2-473		2TM-S47
C110	.047 50V 10%		V84C2S47-10%		PM2S47	1DP-2-473		2TM-S47
C111	.0082 50V 10%		P684CM-0082			6DP-1-822	GEM-16282	5BF-D82
C112	.22 50V 10%		V84C2P22-10%		PM2P22	1DP-3-224	GEM-2022	2TM-P22
C113	2200 10%		DI-2200		PM6D22	CCD-222	GP222	10TS-D22
C114	.022 50V 10%		V84C2S22-10%		PM4S22	1DP-1-223		2TM-S22
C115	.33 50V 10%		V84C2P33-10%		PM2P33	2DP-5-334	GEM-2033	2WF-P33

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: BELL SOUND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R137A	100K	½	15B72	B-36		B17-128	U40	Left Volume Note 2
B	Shaft			Not Req.		SK-1	Not Req.	
R138A	100K	½	15B72	B-36		B17-128	U40	Right Volume Note 2
B	Shaft			Not Req.		SK-1	Not Req.	

Note 2. Some versions may use 500K in this application.

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R139	4700Ω	
R140	100K	
R141	22Ω	
R142	39Ω	
R143	470Ω	
R144	270Ω	
R145	100K	
R146	220K	
R147	18K	
R148	22K	
R149	560Ω	
R150	6800Ω	
R151	47Ω	
R152	2200Ω	
R153	27K	
R154	68K	
R155	1800Ω	
R156	3900Ω	

ITEM No.	RATING	REMARKS
R157	22K	
R158	3900Ω	
R159	18K	
R160	22K	
R161	68K	
R162	5600Ω	
R163	4700Ω	
R164	100K	
R165	22Ω	
R166	39Ω	
R167	470Ω	
R168	270Ω	
R169	100K	
R170	220K	
R171	18K	
R172	22K	
R173	560Ω	
R174	6800Ω	

ITEM No.	RATING	REMARKS
R175	47Ω	
R176	2200Ω	
R177	27K	
R178	68K	
R179	1800Ω	
R180	3900Ω	
R181	22K	
R182	3900Ω	
R183	18K	
R184	22K	
R185	68K	
R186	5600Ω	
R187	15K	
R188	68Ω	
R189	220Ω	
R190	1000Ω	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: BELL SOUND PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	NOTES
L2	Osc. Coil	31A33 ①				① Alternate Part #31A48

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	REPLACEMENT DATA: BELL SOUND PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T7	117V@ .03A	22VCT @ .035A	6.3V @ 2A	32B96					

POWER RECTIFIERS

ITEM No.	RATING: CURRENT (Measured)	REPLACEMENT DATA: BELL SOUND PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M19	.035A	42A6	1N1763	40K	SR500	Silicon Type
M20	.035A	42A6	1N1763	40K	SR500	Silicon Type

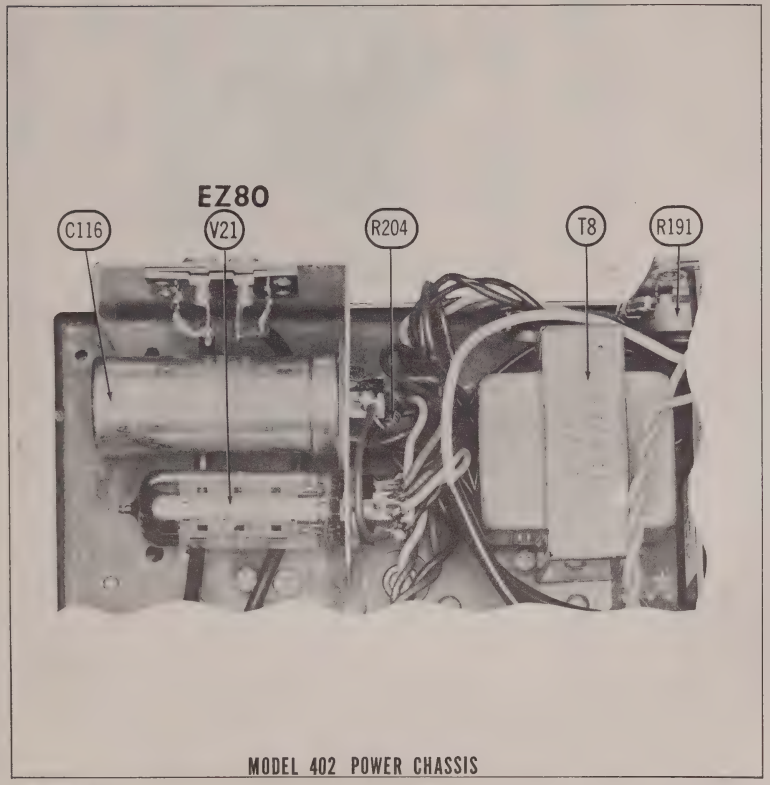
SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: BELL SOUND PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M21	1N60	42X3		1N60	1N60	Base, Meter Amp. (Left Channel)
M22	1N60	42X3		1N60	1N60	Base, Meter Amp. (Right Channel)

MODEL 403 AMP PARTS LIST (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	BELL SOUND PART No.	NOTES
M23	Head	36B10	Playback
M24	Head	36B11	Erase
M25	Switch	43B73	Function
M26	Switch	43B52	Off-On
M27	Switch	43A53	Automatic Stop
M28	Meter	46B5	Left Channel Recording Level Indicator
M29	Meter	46B5	Right Channel Recording Level Indicator
M30	Motor	35C10	Drive



MODEL 402 POWER CHASSIS

MODEL 402 AMP PARTS LIST AND DESCRIPTIONS

TUBES

• GENERAL ELECTRIC •		• RAYTHEON •		• SYLVANIA •	
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V19 V20	Left Channel Preamp. Right Channel Preamp.	ECC83/12AX7 ECC83/12AX7	V21	Rectifier	EZ80

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA BELL SOUND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C116A B	■40 ▲20	250 250	23B51	AFH2-28	B0230	FP230	TMD-26	TVL-2519	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C117	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C118	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C119	560 10%		DI-560	DD-561	1R5T56	CCD-561	GP356	10TS-T56
C120	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C121	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C122	560 10%		DI-560	DD-561	1R5T56	CCD-561	GP356	10TS-T56

CONTROLS

ITEM No.	RATING RESIST-ANCE	RATING WATTS	REPLACEMENT DATA BELL SOUND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R191A B	250Ω Shaft		15B35	B-2 Not Req.		B11-201 TM4		Hum Balance

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R192	220K	
R193	220K	
R194	2200Ω	
R195	10meg	
R196	220K	

ITEM No.	RATING	REMARKS
R197	330K	
R198	220K	
R199	220K	
R200	2200Ω	
R201	10meg	

ITEM No.	RATING	REMARKS
R202	220K	
R203	330K	
R204	47K	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA BELL SOUND PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T8	117V@ .12A	300VCT @ .001A	6.3V@ 1.2A	32B70					

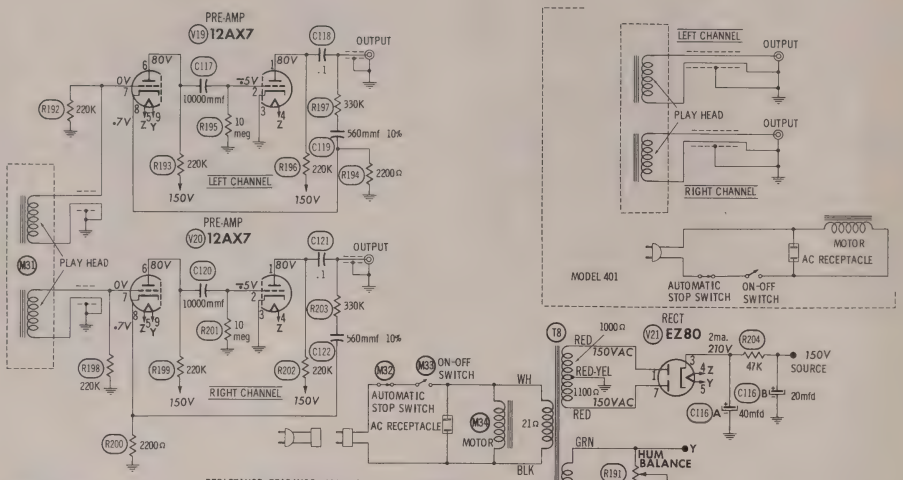
MISCELLANEOUS

ITEM No.	PART NAME	BELL SOUND PART No.	NOTES
M31	Head	36B9	Playback
M32	Switch	43B52	Off-On
M33	Switch	43A53	Automatic Stop
M34	Motor	35C10	Drive

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	84A35	All controls and switch



RESISTANCE READINGS (CONT.) MODEL 402

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V19	ECC83 12AX7	† 270K	10meg	0Ω	75Ω	75Ω	† 270K	†	2200Ω	75Ω
V20	ECC83 12AX7	† 270K	10meg	0Ω	75Ω	75Ω	† 270K	†	2200Ω	75Ω
V21	EZ80	1000Ω	NC	¶	75Ω	75Ω	NC	1100Ω	NC	NC

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 3 OF V21.
‡ DO NOT MEASURE
NC NO CONNECTION

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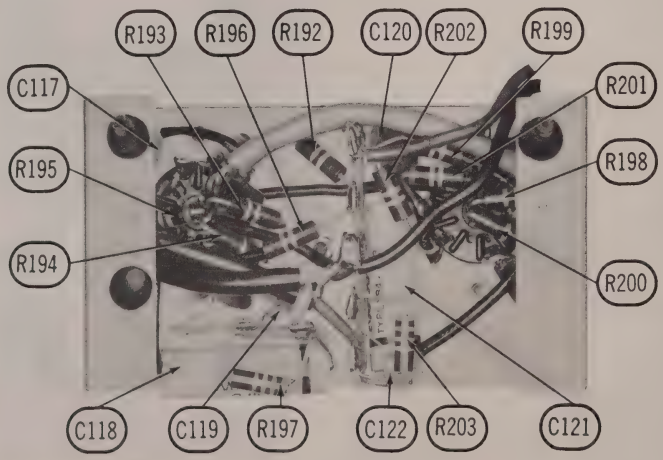
MODEL 401, 402



MODEL 402 PREAMP. CHASSIS - BOTTOM VIEW

PHOTOFACT® Folder with CIRCUITRACE®

COLUMBIA MODELS 600BX, 600G

COLUMBIA MODELS 600BX, 600G

TRADE NAME	Columbia Models 600BX, 600G
MANUFACTURER	Columbia Phonographs, Dept. of CBS Electronics, 405 Park Ave., NewYork, N. Y.
TYPE SET	Battery Operated Transistorized Portable AM Receiver
POWER SUPPLY	9 Volts DC
RATING	10MA @ 9 Volts DC (No Signal, Min. Volume)
TUNING RANGE—BROADCAST	535 — 1650KC
	15MA @ 9 Volts DC (Signal, Normal Volume)

COLUMBIA MODELS 600BX, 600G

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2, A3, A4...GENERAL CEMENT #8607, 9291, 9294
WALSCO #2520, 2522, 2523, 2524, 2534, 2537
A5, A7.....GENERAL CEMENT #5000, 5003, 5066, 8271, 8272, 8276, 8277, 8290, 8609, 8722, 9150, 9298
WALSCO #2515, 2516, 2518, 2519, 2525, 2541

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side to antenna jack. Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Adjust for maximum output.
2.	Loop	535KC	Tuning gang fully closed.	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	1650KC	Tuning gang fully open.	"	A5	Adjust for maximum output. Repeat Steps 2 and 3.
4.	"	600KC	600KC Signal.	"	A6	Adjust for maximum output.
5.	"	1400KC	1400KC Signal.	"	A7	Adjust for maximum output. Repeat Steps 4 and 5.

SET 512 FOLDER 5

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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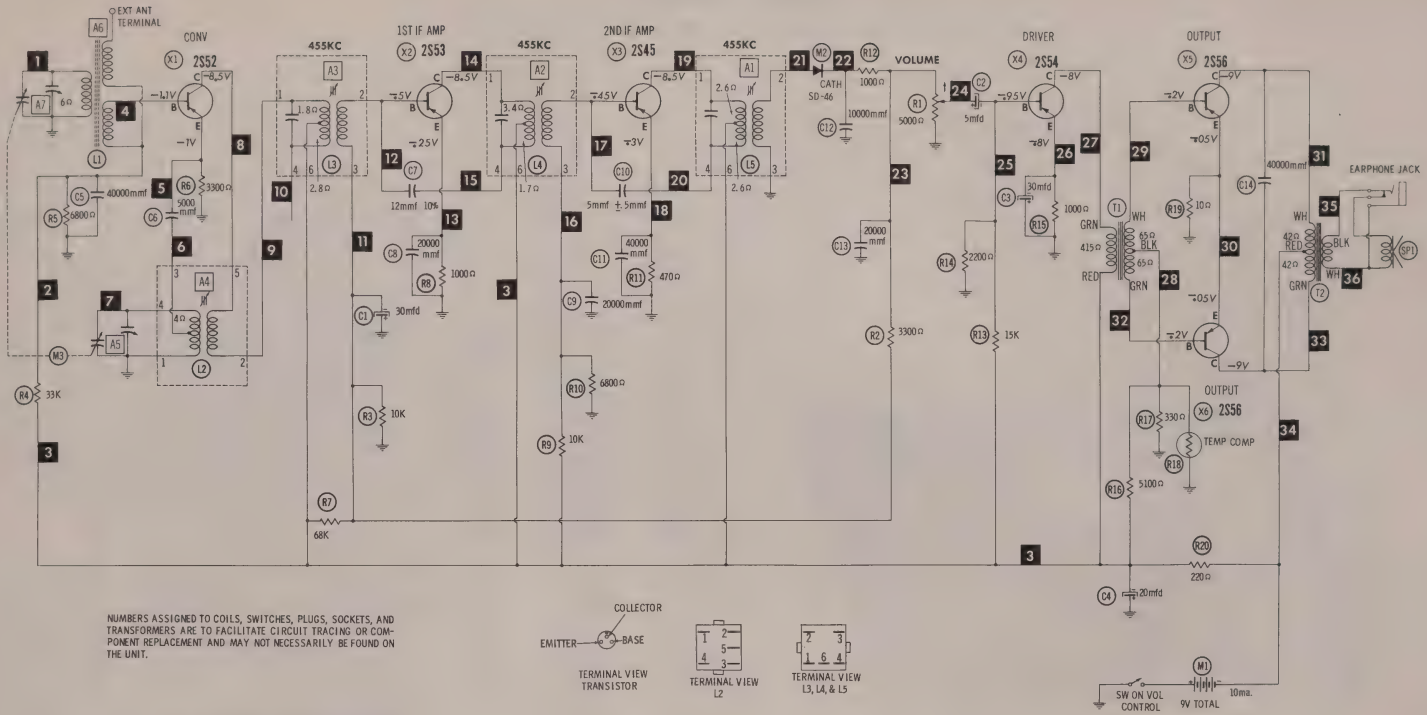

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACK

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COLUMBIA MODELS 600BX, 600G

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2S52	Converter	2N412	2N486	2N412	PNP
X2	2S53	1st IF Amp.	2N410	2N483	2N410	PNP
X3	2S45	2nd IF Amp.	2N410	2N483	2N410	PNP
X4	2S54	Driver	2N408	2N362	2N408	PNP
X5	2S56	Output	2N408	2N632	2N408	PNP } Matched
X6	2S56	Output	2N408	2N632	2N408	PNP } Pair

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	COLUMBIA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	30	3			NLW25-3		ML25-3		
C2	5	3		XPP-3005	NLW5-6	TT6X5	ML5-6		
C3	30	3			NLW25-3		ML25-3		
C4	20	10							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	40000							
C6	5000		C80V502AM	DDM-502	H-05D5	CCD-502	TA-250	TG-S50
C7	12 10%		DI-12	DD-150	L10Q12	CCD-120	GP412	10TS-Q12
C8	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C9	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C10	5 + .5mmf		NPO-DI 5.0	DTZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C11	40000							
C12	10000		C80V103AM	DDM-103	H-05S1	CCD-103	TA-110	TG-S10
C13	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C14	40000							

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	COLUMBIA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/4	9H646	B16-214				Volume & Switch

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	3300Ω	
R3	10K	
R4	33K	
R5	6800Ω	
R6	3300Ω	
R7	68K	
R8	1000Ω	

ITEM No.	RATING	REMARKS
R9	10K	
R10	6800Ω	
R11	470Ω	
R12	1000Ω	
R13	15K	
R14	2200Ω	
R15	1000Ω	

ITEM No.	RATING	REMARKS
R16	5100Ω	
R17	330Ω	
R18	Temp. Comp.	#16H451
R19	10Ω	
R20	220Ω	

Columbia Part Number.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		COLUMBIA PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	20H366				
L2	Osc. Coil	20H364				
L3	1st IF Trans.	20H367				
L4	2nd IF Trans.	20H368				
L5	3rd IF Trans.	20H369				

PRINTED BOARD

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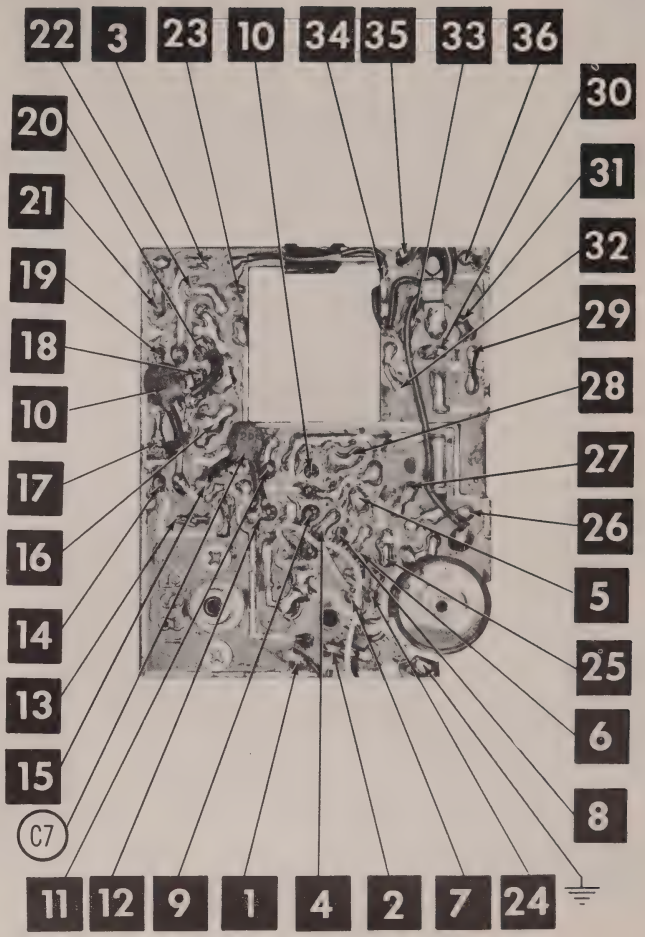


PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	COLUMBIA PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.3	1	20H370					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	COLUMBIA PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	1000Ω CT	8-10Ω	3H256						

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	COLUMBIA PART No.	QUAM PART No.	
SP1	2 1/4"	PM	8-10Ω	1H161	22A06Z10	

BATTERIES

ITEM No.	VOLTAGE	COLUMBIA	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
		PART No.	"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V	BL-006P		2U6		216		M-1604	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		COLUMBIA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	SD-46	1N60	1N60	1N60	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	COLUMBIA PART No.	NOTES
M3	Tuning Cap.	14H114	2 Gang
	Printed Board	1865	
	Earphone	19H710	

CABINETS & CABINET PARTS

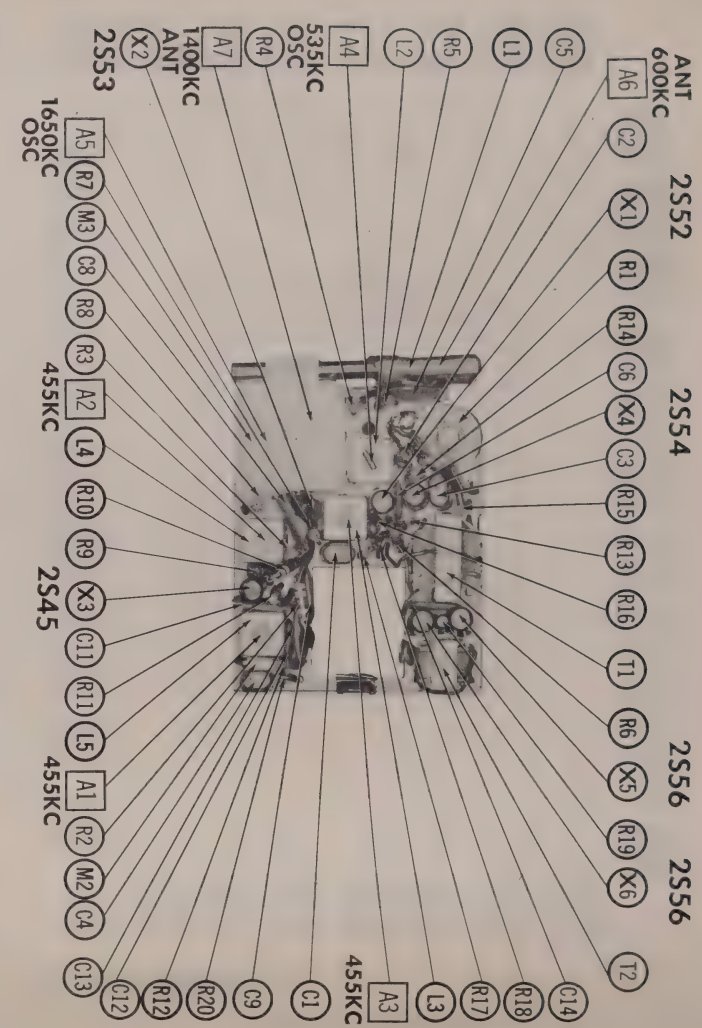
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	8H526	Tuning
Knob	8H527	Volume
Cabinet	17H891	Green
Cabinet	17H892	Black

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT® Folder

CORONADO
MODEL RA-48-8182

CORONADO
MODEL RA-48-8182

CORONADO
MODEL RA-48-8182

TRADE NAME	Coronado Model RA48-8182
SUPPLIER	Gamble-Skogmo, Inc., 15 N. Eighth Street, Minneapolis 3, Minn.
TYPE SET	AC Operated 4 Tube AM Receiver With Electric Clock
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 26 Watts, .25 Amp. @117 Volts AC (Less Clock)
TUNING RANGE—BROADCAST	540 — 1650KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2.....GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545
A3, A4....GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to antenna stator lug of tuning gang. Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2	Adjust for maximum output.
2.	"	1650KC	"	"	A3	"
3.	Loop	1500KC	1500KC Signal	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

SET 512 FOLDER 6

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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KG142

PARTS LIST AND DESCRIPTIONS

TUBES

• GENERAL ELECTRIC •			• RAYTHEON •		• SYLVANIA •		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE		
V1	Converter	12AU6	V3	Output	50C5		
V2	Det.-AF Amp.	12AV6	V4	Rectifier	35W4		

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	CORONADO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	60	150	150-141	PRS3700	BBRT53215	TCT3107	TDLT-6	TVAS-3454 *	
B	30	150							
C	10	150							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	50 N220 10%	#156-107				*		10TCR-Q47
C3	10 N750		N750-SI 10	TCN-10	C10QIU	CCTN-100	CN7-410	10TCU-Q10
C4	.01 600V		P688N-01	D6-103	CUB6SI	6DP-2-103	GEM-611	6TM-S1
C5	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C6	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C7	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1

\# Coronado Part Number.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CORONADO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	2meg	½	120-116	B-76	A47-2meg-Z	Q13-139	U55	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	2.2meg	
R3	6.8meg	

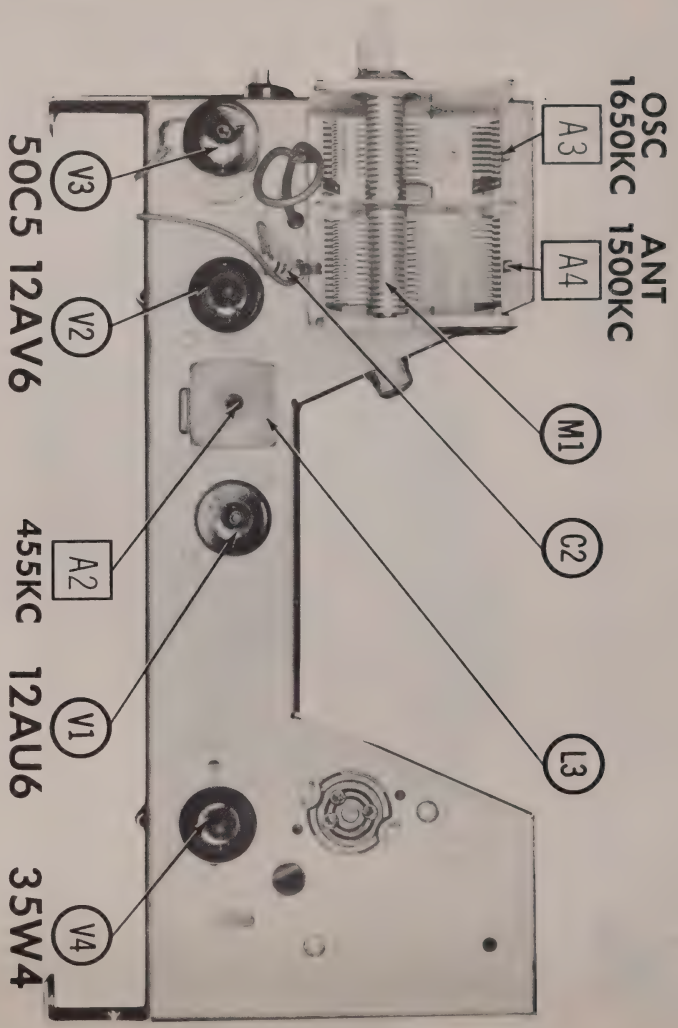
ITEM No.	RATING	REMARKS
R4	150Ω	
R5	2200Ω	

ITEM No.	RATING	REMARKS
R6	68Ω 2W	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	CORONADO PART No.	REPLACEMENT DATA	
K1	Audio Coupling	250mmf, 5000mmf, 270K, 470K	116-109	Aerovox	PA-112-2
				Centralab	PC-71
				Cornell-Dubilier	112TM2
				Sprague	T-4

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		CORONADO PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loop Ant.	134-117				
L2	Osc. Coil	136-148				
L3	IF Trans.	130-106				

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	CORONADO PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2500Ω	3-4Ω	138-118B	A-3025	AU-605	A-3332	24S53	S-12X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	CORONADO PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	175-131	4A07	

MISCELLANEOUS

ITEM No.	PART NAME	CORONADO PART No.	NOTES
M1	Tuning Cap.	160-110B	2 Gang, Ant. 38-490mmf, Osc. 22-186mmf
M2	Clock Ass'y.	207-113	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

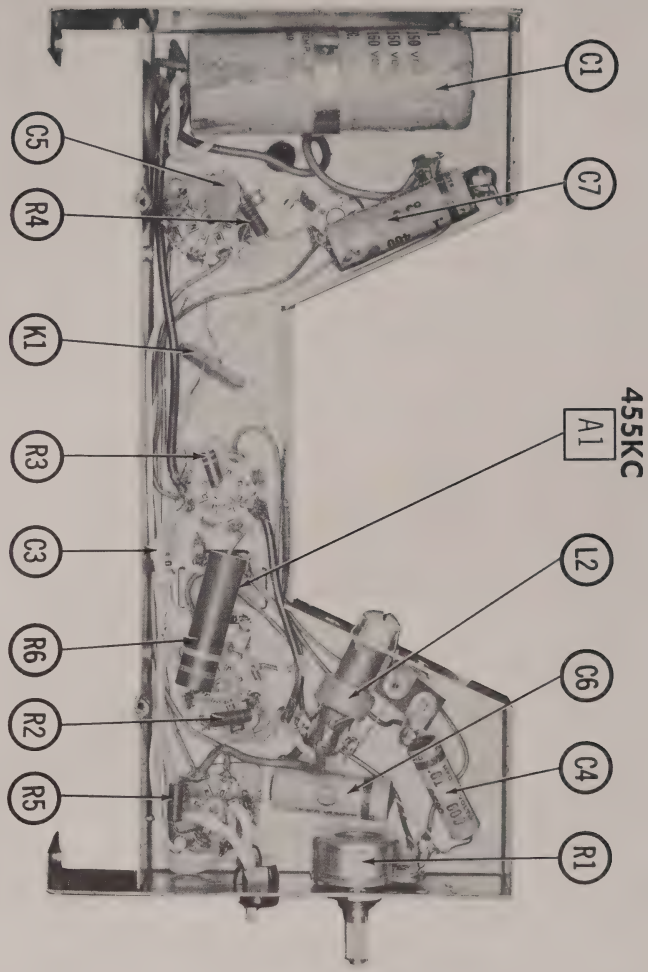
NAME	PART NO.	DESCRIPTION
Knob	220-124	Tuning
Knob	200-104	Volume
Knob	220-161	Clock
Crystal	205-122	Clock
Cabinet	210-180	

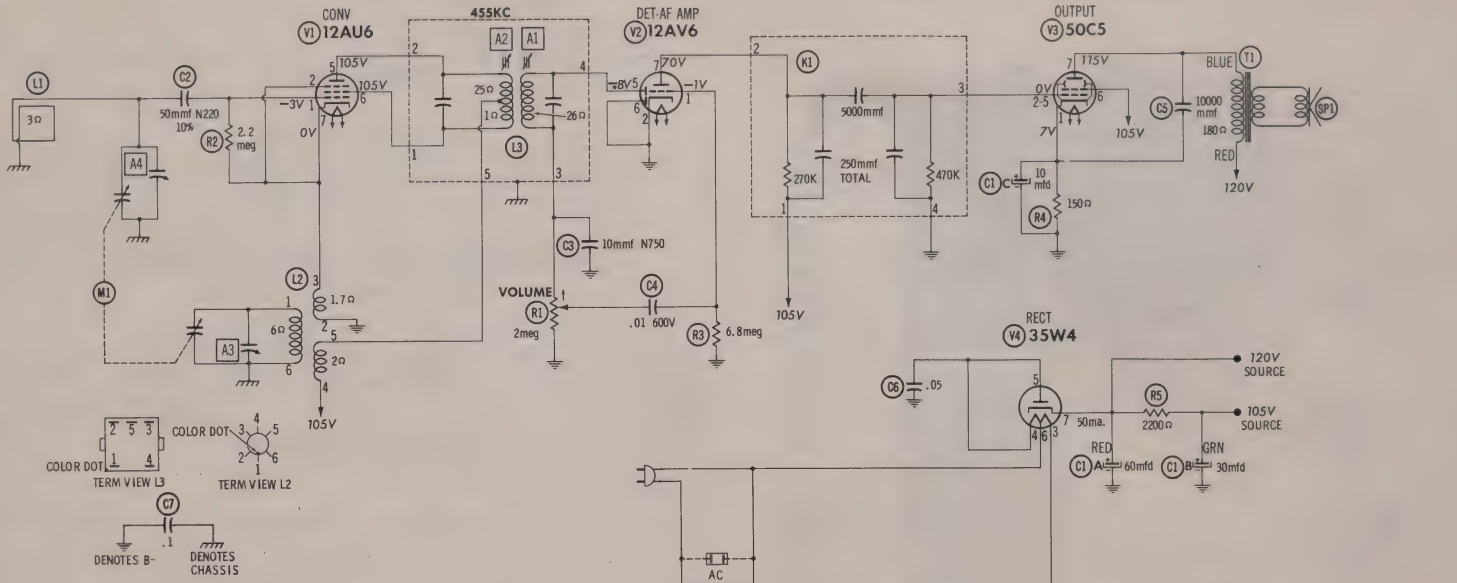
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12AU6	2.2meg	1.7Ω	89Ω	78Ω	†2200Ω	†2200Ω	1.7Ω
V2	12AV6	6.8meg	0Ω	0Ω	10Ω	2meg	0Ω	†270K
V3	50C5	150Ω	NC	89Ω	130Ω	470K	†2200Ω	†180Ω
V4	35W4	TP	TP	130Ω	155Ω	155Ω	165Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V4.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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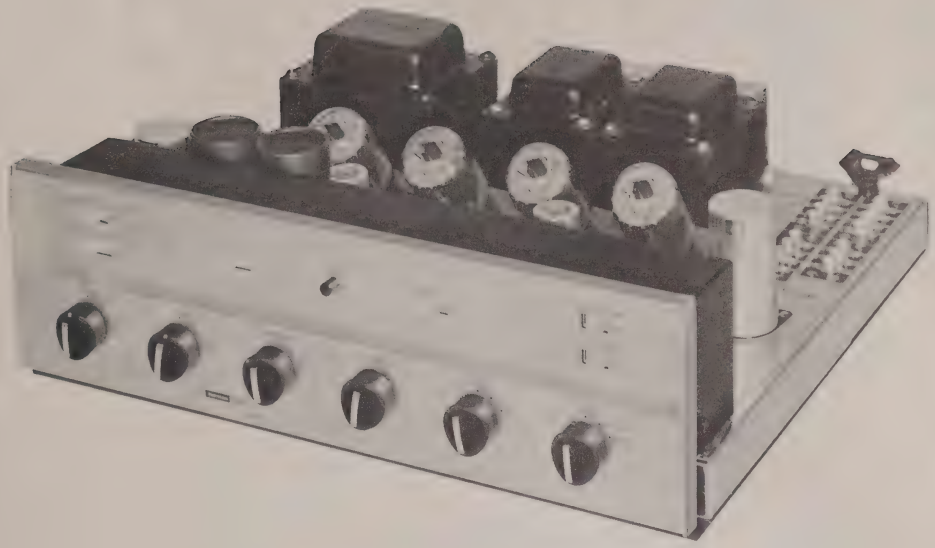
CORONADO
MODEL RA-48-8182

PHOTOFACT® Folder

**HARMAN-KARDON
MODEL A-260**

HARMAN-KARDON
MODEL A-260



HARMAN-KARDON
MODEL A-260

TRADE NAME	Harman-Kardon Model A-260 (The Chorale)
MANUFACTURER	Harman-Kardon, Inc., 520 Main Street, Westbury, L. I., N. Y.
TYPE SET	AC Operated 10 Tube Multi-Input Stereo Amplifier
POWER SUPPLY	105 - 125 Volts AC, 60 Cycles RATING 200 Watts, 2.1 Amp. @117 Volts AC

ADJUSTMENTS

OUTPUT TUBE BALANCE ADJUSTMENT

1. Set Volume control to MINIMUM.
2. Turn off all equipment connected to the amplifier.
3. Slowly adjust Balance control (located between Output tubes) for MINIMUM hum.
4. If no hum can be heard, set control to mid-position.
5. For best performance, adjustment should be made using an Intermodulation Distortion Analyzer.

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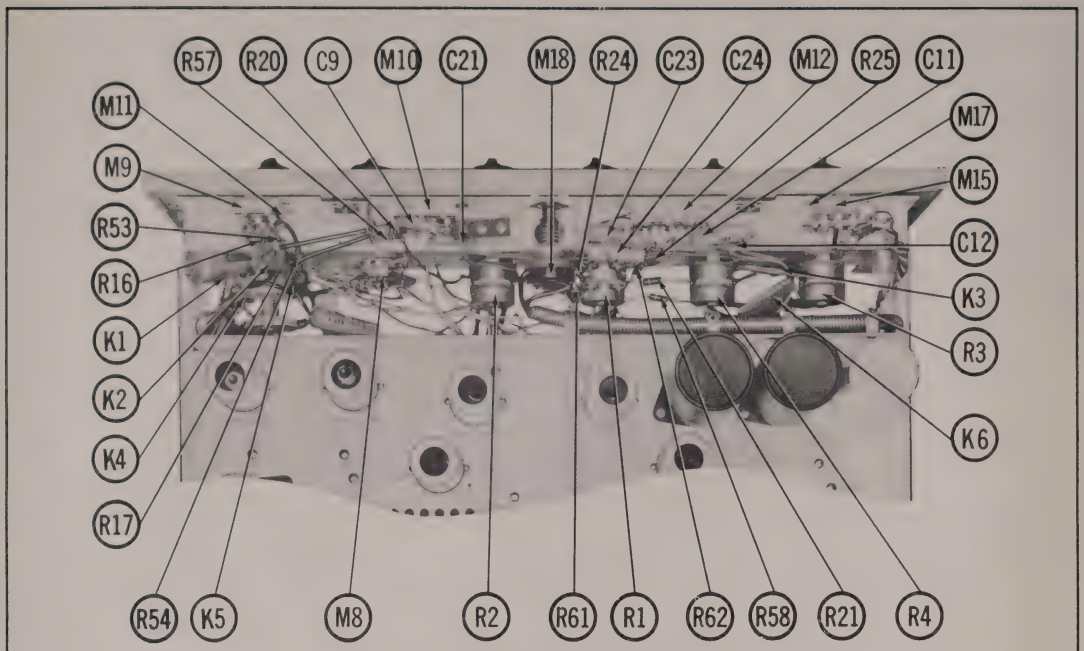
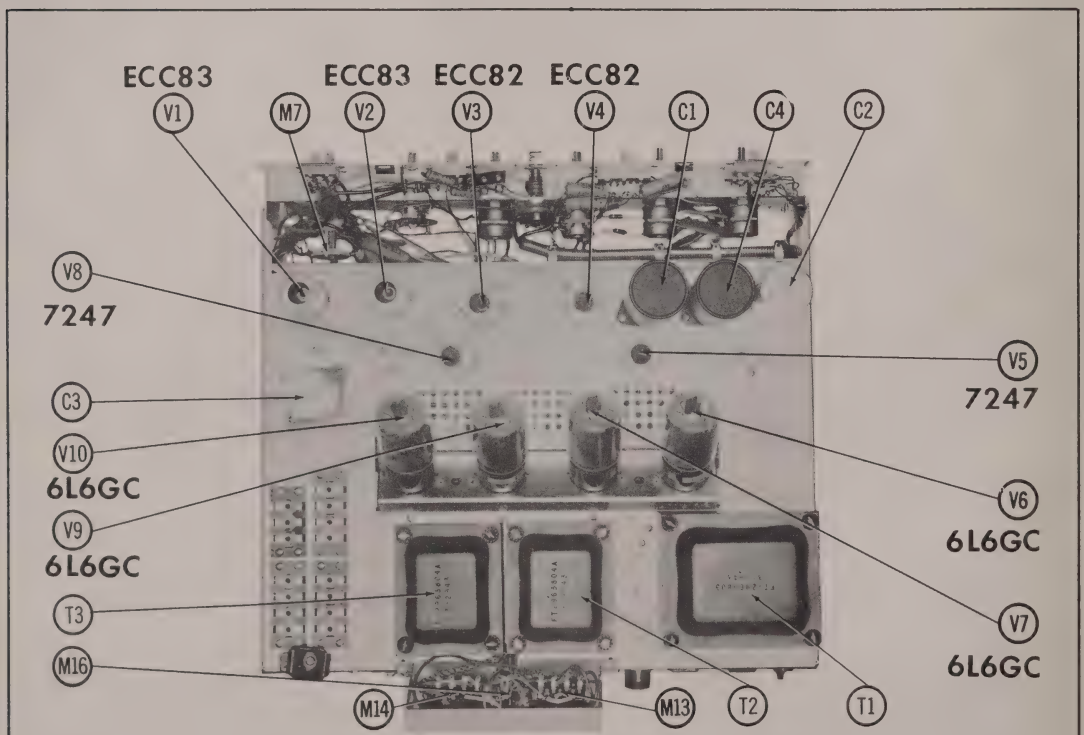
KV042

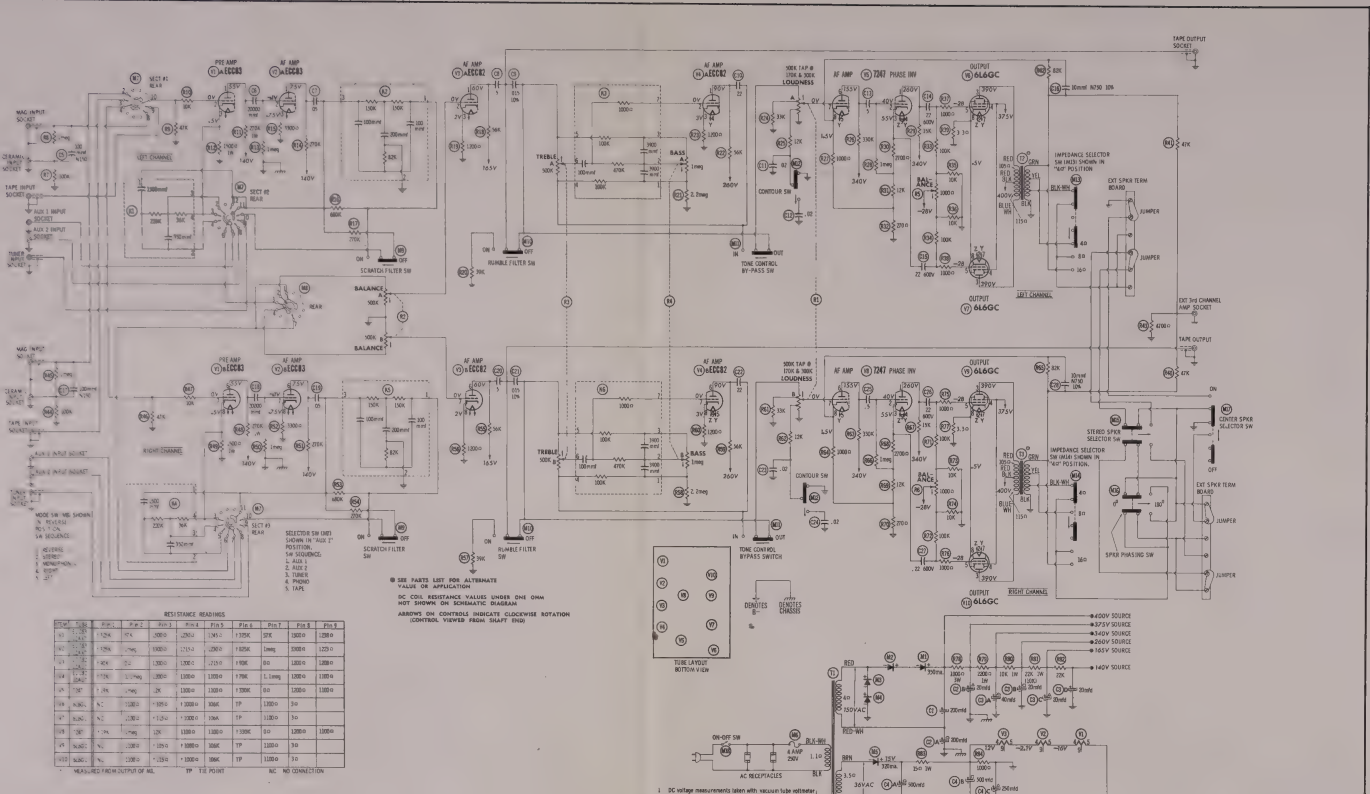
SET 512 FOLDER 7



CONTROL PANEL—REAR VIEW



CHASSIS—TOP VIEW



RESISTANCE READINGS

STAGE	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
1	ECC83	1.25Ω	0Ω	200Ω	1.2KΩ	0Ω	1.375K	0Ω	100Ω	1.28KΩ
2	ECC83	1.25Ω	0Ω	190Ω	1.2KΩ	0Ω	1.375K	0Ω	100Ω	1.28KΩ
3	ECC82	1.40Ω	0Ω	1.3KΩ	1.3KΩ	0Ω	1.41KΩ	0Ω	1.2KΩ	1.28KΩ
4	ECC82	1.40Ω	0Ω	1.3KΩ	1.3KΩ	0Ω	1.41KΩ	0Ω	1.2KΩ	1.28KΩ
5	ECC83	1.34Ω	0Ω	2K	1.3KΩ	1.3KΩ	1.35KΩ	0Ω	1.2KΩ	1.32KΩ
6	ECC83	1.34Ω	0Ω	2K	1.3KΩ	1.3KΩ	1.35KΩ	0Ω	1.2KΩ	1.32KΩ
7	7247	1.34Ω	0Ω	2K	1.3KΩ	1.3KΩ	1.35KΩ	0Ω	1.2KΩ	1.32KΩ
8	6L6GC	0Ω	0Ω	1.2KΩ	1.2KΩ	1.2KΩ	1.2KΩ	TP	1.2KΩ	3Ω
9	6L6GC	0Ω	0Ω	1.2KΩ	1.2KΩ	1.2KΩ	1.2KΩ	TP	1.2KΩ	3Ω
10	6L6GC	0Ω	0Ω	1.2KΩ	1.2KΩ	1.2KΩ	1.2KΩ	TP	1.2KΩ	3Ω
11	6L6GC	0Ω	0Ω	1.2KΩ	1.2KΩ	1.2KΩ	1.2KΩ	TP	1.2KΩ	3Ω
12	6L6GC	0Ω	0Ω	1.2KΩ	1.2KΩ	1.2KΩ	1.2KΩ	TP	1.2KΩ	3Ω

MEASURED FROM OUTPUT OF MIL — TP TIE POINT — NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohms per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±10% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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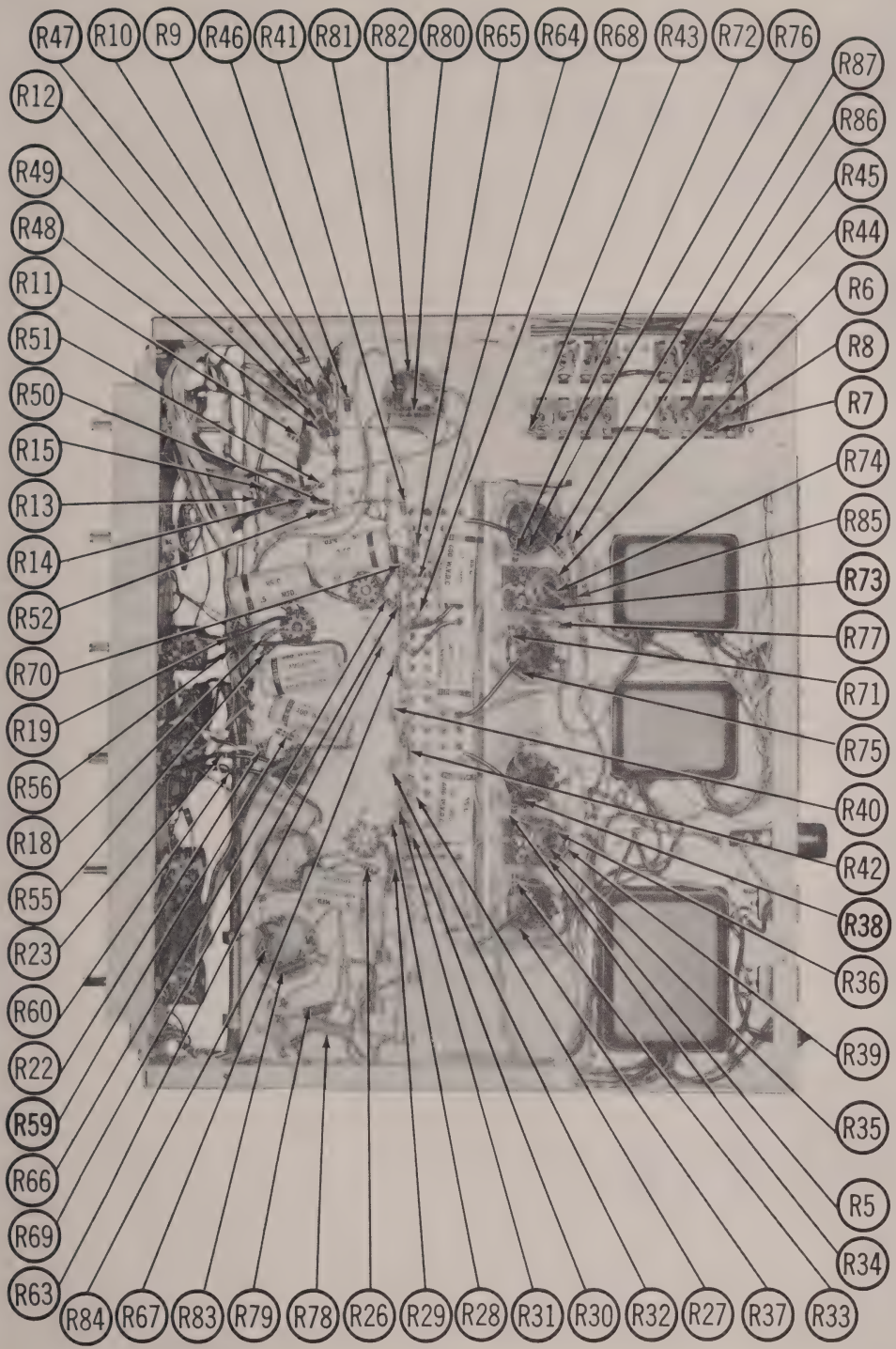
HARMAN-KARDON
MODEL A-260



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)

TUBES

ITEM No.	USE	TYPE (• GENERAL ELECTRIC • RAYTHEON • SYLVANIA •)
V1	Left Channel Preamp. - Right Channel Preamp.	ECC83/12AX7
V2	Left Channel AF Amp. - Right Channel AF Amp.	ECC83/12AX7
V3	Left Channel AF Amp. - Right Channel AF Amp.	ECC82/12AU7
V4	Left Channel AF Amp. - Right Channel AF Amp.	ECC82/12AU7
V5	Left Channel AF Amp. - Phase Inverter	7247
V6	Left Channel Output	6L6GC
V7	Left Channel Output	6L6GC
V8	Right Channel AF Amp. - Phase Inverter	7247
V9	Right Channel Output	6L6GC
V10	Right Channel Output	6L6GC

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Harman - Kardon PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	200	250	JE2963810	AFH1-31-75	XA0318	FP126	TMS-75	TVL-1547	
C2A	▲200	250	JE2963811	AFHS2-94-75	XA0318	FP126	TMD-103	TVL-1547	
B	▲20	400			BR2045	TC75		TVA-1709	
C3A	▲40	400	JE2963812	AFH4-06	C0270	FP444.8	TMQ-7	TVL-4672.8	
B	■20	400			BR4025				
C	▲20	400							
D	20	400							
C4A	▲500	50	JE2963813						
B	■500	50							
C	▲250	50							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	100 N150					*		10TCP-T10
C6	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C7	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C8	.5 400V		P488N-5		CUB4P5		GEM-405	4TM-P5
C9	.015 100V 10%		V84C2S15-10%		PM4S15	1DP-1-153		4TM-S15
C10	.22 400V		P488N-22		CUB4P22	4DP-5-224	GEM-4022	4TM-P22
C11	.02 100V		P288N-02	DD-203	CUB2S2	1DP-1-203	GEM-412	2TM-S2
C12	.02 100V		P288N-02	DD-203	CUB2S2	1DP-1-203	GEM-412	2TM-S2
C13	.5 400V		P488N-5		CUB4P5		GEM-405	4TM-P5
C14	.22 600V		P688N-22		CUB6P22	6DP-5-224	GEM-6022	6TM-P22
C15	.22 600V		P688N-22		CUB6P22	6DP-5-224	GEM-6022	6TM-P22
C16	10 N750 10%		N750-DI 10	DTN-10	C10Q1U	CCTN-100	CN7-410	10TCU-Q10
C17	100 N150					*		10TCP-T10
C18	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C19	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C20	.5 400V		P488N-5		CUB4P5		GEM-405	4TM-P5
C21	.015 100V 10%		V84C2S15-10%		PM4S15	1DP-1-153		4TM-S15
C22	.22 400V		P488N-22		CUB4P22	4DP-5-224	GEM-4022	4TM-P22
C23	.02 100V		P288N-02	DD-203	CUB2S2	1DP-1-203	GEM-412	2TM-S2
C24	.02 100V		P288N-02	DD-203	CUB2S2	1DP-1-203	GEM-412	2TM-S2
C25	.5 400V		P488N-5		CUB4P5		GEM-405	4TM-P5
C26	.22 600V		P688N-22		CUB6P22	6DP-5-224	GEM-6022	6TM-P22
C27	.22 600V		P688N-22		CUB6P22	6DP-5-224	GEM-6022	6TM-P22
C28	10 N750 10%		N750-DI 10	DTN-10	C10Q1U	CCTN-100	CN7-410	10TCU-Q10

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Harman-Kardon PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K *		RV2963560					Loudness, Left Channel
B	500K *							Loudness, Right Channel
R2A	500K		RV2963559	B-59	AD47-500K-S			Balance, Left Channel
B	500K			SR-59	Not Req.		FA55L	Balance, Right Channel
C	Shaft			Not Req.	KSS-3		RU55L	
R3A	500K		RV2963552				CS3500	Treble, Left Channel
B	500K							Treble, Right Channel
C	Shaft							
R4A	1meg		RV2963551					Bass, Left Channel
B	1meg							Bass, Right Channel
C	Shaft							
R5A	1000Ω		RV2783331			B11-108		Output Balance, Left Chann
B	Shaft					TM4		
R6A	1000Ω		RV2783331			B11-108		Output Balance, Right Chann
B	Shaft					TM4		

* Taps @ 170K & 300K.

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R7	100K	
R8	1meg	
R9	47K	
R10	10K	
R11	270K 1W	
R12	1500Ω 1W	
R13	1meg	
R14	270K	
R15	3300Ω	
R16	680K	
R17	270K	
R18	56K	
R19	1200Ω	
R20	39K	
R21	2.2meg	
R22	56K	
R23	1200Ω	
R24	33K	
R25	12K	
R26	330K	
R27	1000Ω	
R28	1meg	
R29	15K	
R30	2700Ω	
R31	12K	
R32	270Ω	
R33	100K	

ITEM No.	RATING	REMARKS
R34	100K	
R35	10K	
R36	10K	
R37	1000Ω	
R38	1000Ω	
R39	3.3Ω	
R40	47K	
R41	47K	
R42	82K	
R43	4700Ω	
R44	100K	
R45	1meg	
R46	47K	
R47	10K	
R48	270K 1W	
R49	1500Ω 1W	
R50	1meg	
R51	270K	
R52	3300Ω	
R53	680K	
R54	270K	
R55	56K	
R56	1200Ω	
R57	39K	
R58	2.2meg	
R59	56K	
R60	1200Ω	

ITEM No.	RATING	REMARKS
R61	33K	
R62	12K	
R63	330K	
R64	1000Ω	
R65	82K	
R66	1meg	
R67	15K	
R68	2700Ω	
R69	12K	
R70	270Ω	
R71	100K	
R72	100K	
R73	10K	
R74	10K	
R75	1000Ω	
R76	1000Ω	
R77	3.3Ω	
R78	1000Ω 3W	
R79	2200Ω 1W	
R80	10K 1W	
R81	22K 1W	(10K) *
R82	22K	
R83	15Ω 1W	
R84	1000Ω	
R85	100Ω	
R86	68Ω	
R87	68Ω	

* Alternate Value.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Harman-Kardon PART No.	REPLACEMENT DATA
K1	Equal. Comp.	350mmf, 1500mmf, 36K, 220K	PC2963818	
K2	Scratch Filter Comp.	100mmf, 100mmf, 200mmf, 82K, 150K, 150K	PCCOM2927	
K3	Tone Comp.	100mmf, 3900mmf, 3900mmf, 1000Ω, 100K, 100K, 470K	PC2382890	
K4	Equal. Comp.	350mmf, 1500mmf, 36K, 220K	PC2963818	
K5	Scratch Filter Comp.	100mmf, 100mmf, 200mmf, 82K, 150K, 150K	PCCOM2927	
K6	Tone Comp.	100mmf, 3900mmf, 3900mmf, 1000Ω, 100K, 100K, 47K	PC2382890	

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	Harman-Kardon PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	117V @ 2.1A	150V @ 1A (AC)	6.3V @ 4.7A	FT2963803					
	SEC. 3	SEC. 4	SEC. 5						
	3.6V @ .4A								

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	Harman-Kardon PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	4800Ω CT	16Ω Tap @ 8Ω, 4Ω	FT2963804A ①					
T3	4800Ω CT	16Ω Tap @ 8Ω, 4Ω	FT2963804A ①					

① Alternate Part #JE2963804.

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	Harman-Kardon PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.350A	Z2382924 *	1N1763 *	40K *	SR500 *	* Silicon Type
M2	.350A	Z2382924 *	1N1763 *	40K *	SR500 *	
M3	.350A	Z2382924 *	1N1763 *	40K *	SR500 *	
M4	.350A	Z2382924 *	1N1763 *	40K *	SR500 *	
M5	.320A	ZCOM3566 *	1N1763 *	40K *	SR500 *	

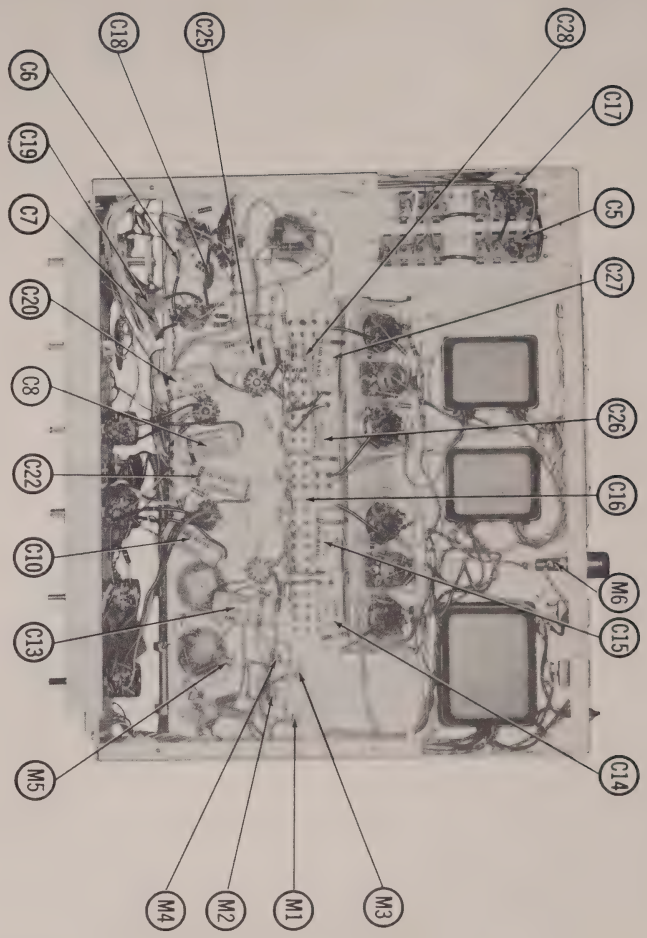
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Harman-Kardon PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M6	3AG	4A	ZCOM3299	HC33901	312004 (3AG 4A 250V)	342001	MTH4	HKP

MISCELLANEOUS

ITEM No.	PART NAME	Harman-Kardon PART No.	NOTES
M7	Switch	ER2963550	Function
M8	Switch	ER2963825	Mode
M9	Switch	ESCOM2727	Scratch Filter (Slide Type DPDT)
M10	Switch	ESCOM2727	Rumble Filter (Slide Type DPDT)
M11	Switch	ESCOM2727	Tone Control Bypass (Slide Type DPDT)
M12	Switch	ES1021717	Loudness Contour (Slide Type DP, 3 Position)
M13	Switch	ESCOM3383	Left Speaker Impedance Selector (Slide Type DP, 3 Position)
M14	Switch	ESCOM3383	Right Speaker Impedance Selector (Slide Type DP, 3 Position)
M15	Switch	ESCOM2727	Stereo Speaker Selector (Slide Type DPDT)
M16	Switch	ESCOM2727	Speaker Phasing (Slide Type DPDT)
M17	Switch		Center Speaker Selector (Slide Type DP 3 Position)
M18	Switch	EP2383260	Power Off-On (Pushbutton type)

CHASSIS—BOTTOM VIEW



PHOTOFACT® Folder with CIRCUITRACE®

MAGNAVOX MODEL AM-22

MAGNAVOX
MODEL AM-22

MAGNAVOX
MODEL AM-22

TRADE NAME	Magnavox Model AM-22
MANUFACTURER	The Magnavox Co., 2131 Bueter Road, Fort Wayne 4, Indiana
TYPE SET	Battery Operated Transistorized Portable AM Receiver
POWER SUPPLY	9 Volts DC RATING 5MA @ 9 Volts DC (No Signal, Min. Volume)
TUNING RANGE—BROADCAST	540 — 1600KC 15MA @ 9 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2, A3, A4....GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A5, A6.....GENERAL CEMENT #5000, 5003, 5066, 8271, 8272, 8276, 8277, 8290, 8609, 8722, 9150, 9298
WALSCO #2515, 2516, 2518, 2519, 2525, 2541

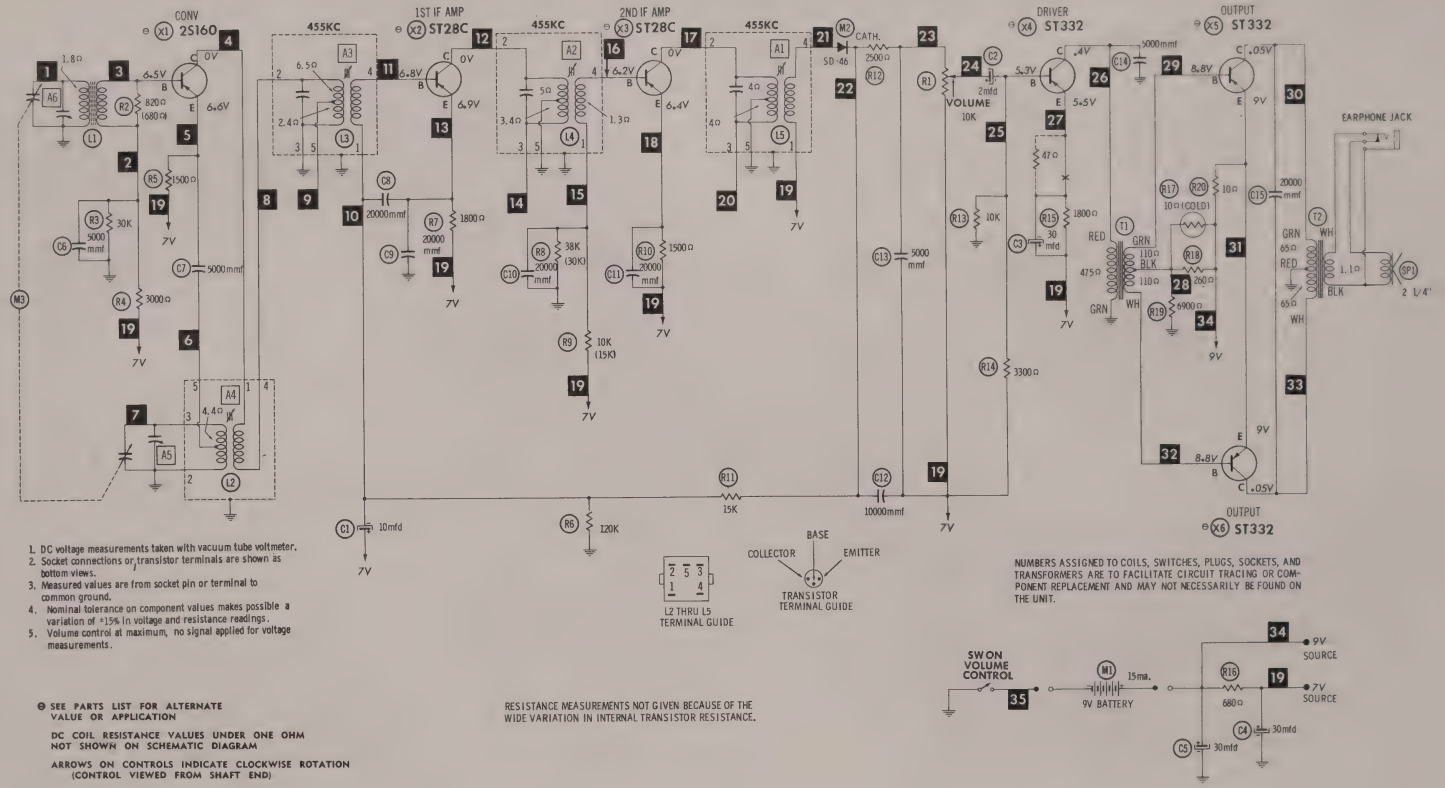
	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400∿ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	535KC	Tuning gang fully closed.	"	A3, A4	"
3.	"	1600KC	1600KC	"	A5, A6	Adjust for maximum output. Recheck Step 2.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

KF143

SET 512 FOLDER 8



1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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MAGNAVOX MODEL AM-22

PARTS LIST AND DESCRIPTIONS

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2S160 ①	Converter		2N485	2N140	PNP
X2	ST28C ②	1st IF Amplifier		2N483	2N139	PNP
X3	ST28C ②	2nd IF Amplifier		2N483	2N139	PNP
X4	ST332 ③	Driver	2N406	2N362	2N109	PNP
X5	ST332 ③	Output	2N408	2N632	2N109	PNP ┐Matched
X6	ST332 ③	Output	2N408	2N632	2N109	PNP ┘Pair

① Alternate Type #2N252 may be used.
② Alternate Type #2N308 may be used.
③ Alternate Type #2N77 may be used.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	10	3	270052-1	XPP-3010	NLW10-3	TT3X10	ML10-6	TE-1053	
C2	2	12	270051-1	XPP-i2002	NLW5-15	TT12X2	ML2-15	TE-1121	
C3	30	6	270053-1	PWE6030	NLW30-6	TT6X30	ML30-6	TE-1092	
C4	30	6	270053-1	PWE6030	NLW30-6	TT6X30	ML30-6	TE-1092	
C5	30	6	270053-1	PWE6030	NLW30-6	TT6X30	ML30-6	TE-1092	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C6	5000		C80V502AM	DDM-502	H-05D5	CCD-502	TA-250	TG-D50
C7	5000		C80V502AM	DDM-502	H-05D5	CCD-502	TA-250	TG-D50
C8	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C9	20000		C80V203AM	DDM-205	H-05S2		TA-120	TG-S20
C10	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C11	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C12	10000		C80V103AM	DDM-103	H-05S1		TA-110	TG-S10
C13	5000		C80V502AM	DDM-502	H-05D5	CCD-502	TA-250	TG-D50
C14	5000		C80V502AM	DDM-502	H-05D5	CCD-502	TA-250	TG-D50
C15	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	10K	1/4	220162-1	B16-216				Volume & Switch

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	820Ω	(680Ω) *
R3	30K	
R4	3000Ω	
R5	1500Ω	
R6	120K	
R7	1800Ω	
R8	38K	(30K)*

ITEM No.	RATING	REMARKS
R9	10K	(15K) *
R10	1500Ω	
R11	15K	
R12	2500Ω	
R13	10K	
R14	3300Ω	
R15	1800Ω	

ITEM No.	RATING	REMARKS
R16	680Ω	
R17	10Ω Cold	#230132-1
R18	260Ω	
R19	6900Ω	
R20	10Ω	

* Alternate Value.
# Magnavox Part Number.

PRINTED BOARD

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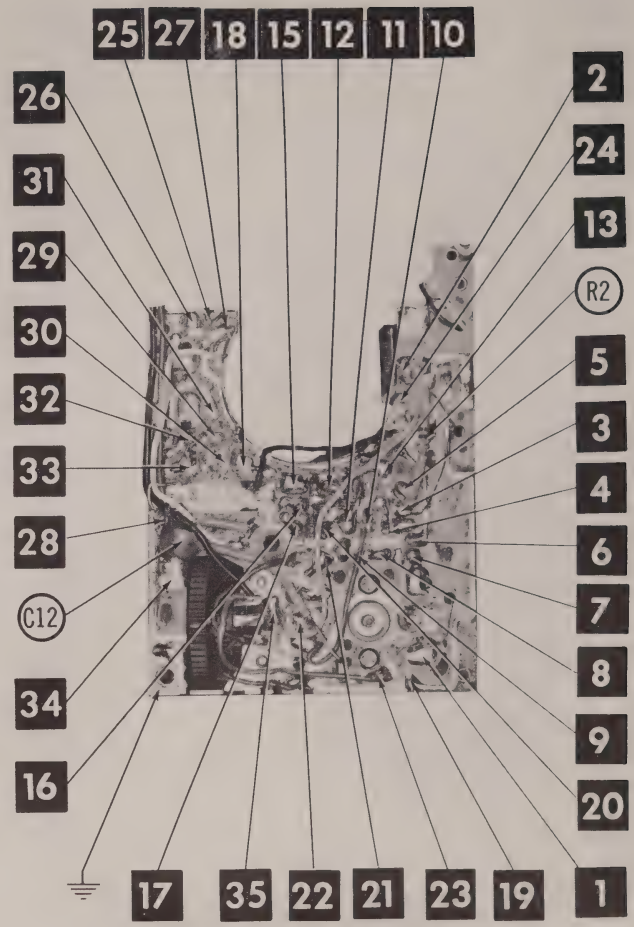


PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		MAGNAVOX PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	360832-1				
L2	Osc. Coil	360831-1				
L3	1st IF Trans.	360835-1				
L4	2nd IF Trans.	360835-2				
L5	3rd IF Trans.	360835-3				

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	MAGNAVOX PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1	1	360834-1					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MAGNAVOX PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	200Ω CT	6-8Ω	320088-1						

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MAGNAVOX PART No.	QUAM PART No.	
SP1	2 1/4"	PM	6-8Ω	580066-1		

BATTERIES

ITEM No.	VOLTAGE	MAGNAVOX PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V			2U6		216		M-1604	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		MAGNAVOX PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	SD-46		1N60	1N60	Detector (Pigtail)

MISCELLANEOUS

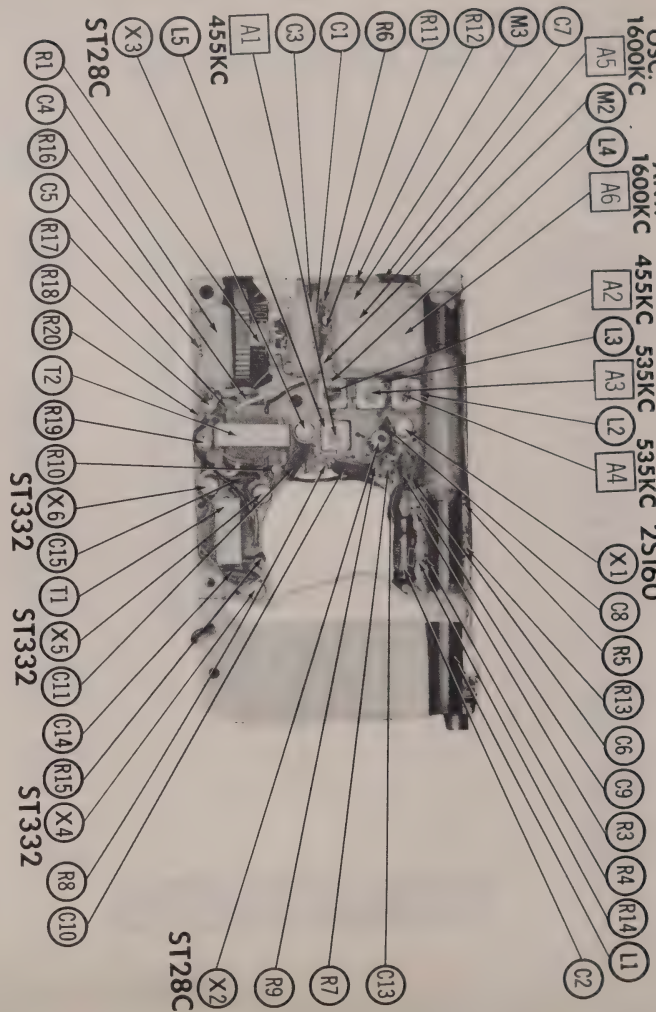
ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M3	Tuning Cap.	260158-1	2 Gang
	Printed Board	210060-1	Less Components

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	140398-1	Tuning
Knob	140399-1	Volume
Cabinet	140397-2	Red, Includes Back
Cabinet	140397-1	Black, Includes Back
Cabinet Back	140402-1	Black
Cabinet Back	140402-2	Red
Carrying Case	400299-1	Leather

CHASSIS—TOP VIEW



PHOTOFACT® Folder with CIRCUITRACE®

TRADE NAME	Mopar Models 106 (02BD) For 1960 Dodge Automobiles, 112 (02BS) For 1960 DeSoto Automobiles
MANUFACTURER	Bendix Radio Div., Bendix Aviation Corp., Baltimore 4, Maryland
TYPE SET	Battery Operated 2 Tube, 2 Transistor Custom Built Automobile AM Receiver
POWER SUPPLY	12 Volt Storage Battery RATING 1 Amp. @ 12 Volts DC
TUNING RANGE—BROADCAST	530 — 1605KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.
Suggested Alignment Tools: A1, A2, A3, A4..... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545
A5, A6..... GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528
A8, A9, A10..... GENERAL CEMENT #9050-L, 9150
WALSCO #2521, 2524,

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of Converter. Low side to chassis.	262.5KC (Unmod.)	High end stop.	DC probe to point (A). Common to chassis.	A1, A2, A3	Adjust for maximum deflection.
2.	Thru dummy (Fig. 1) to antenna receptacle.	1605KC	"	"	A4, A5, A6	"
	Step 3 is not necessary unless tuning coils have been tampered with or associated components have been replaced. If necessary, back tuning cores (A8, A9 and A10) out of coils. Repeat Step 2.					
3.	Thru dummy to antenna receptacle.	1000KC	Tuner carriage 0.5" from high end stop.	DC probe to point (A). Common to chassis.	A7, A8, A9	Adjust for maximum deflection.
4.	With radio installed in car and antenna fully extended, tune in a weak station near 1000KC and adjust A6 for maximum output.					

PUSHBUTTON ADJUSTMENT

1. Pull pushbutton out.
2. Tune manually to desired station.
3. Press pushbutton in firmly.
4. Repeat for remaining pushbuttons.

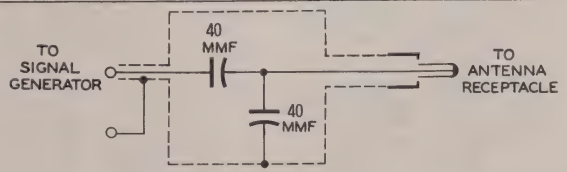


FIG. 1

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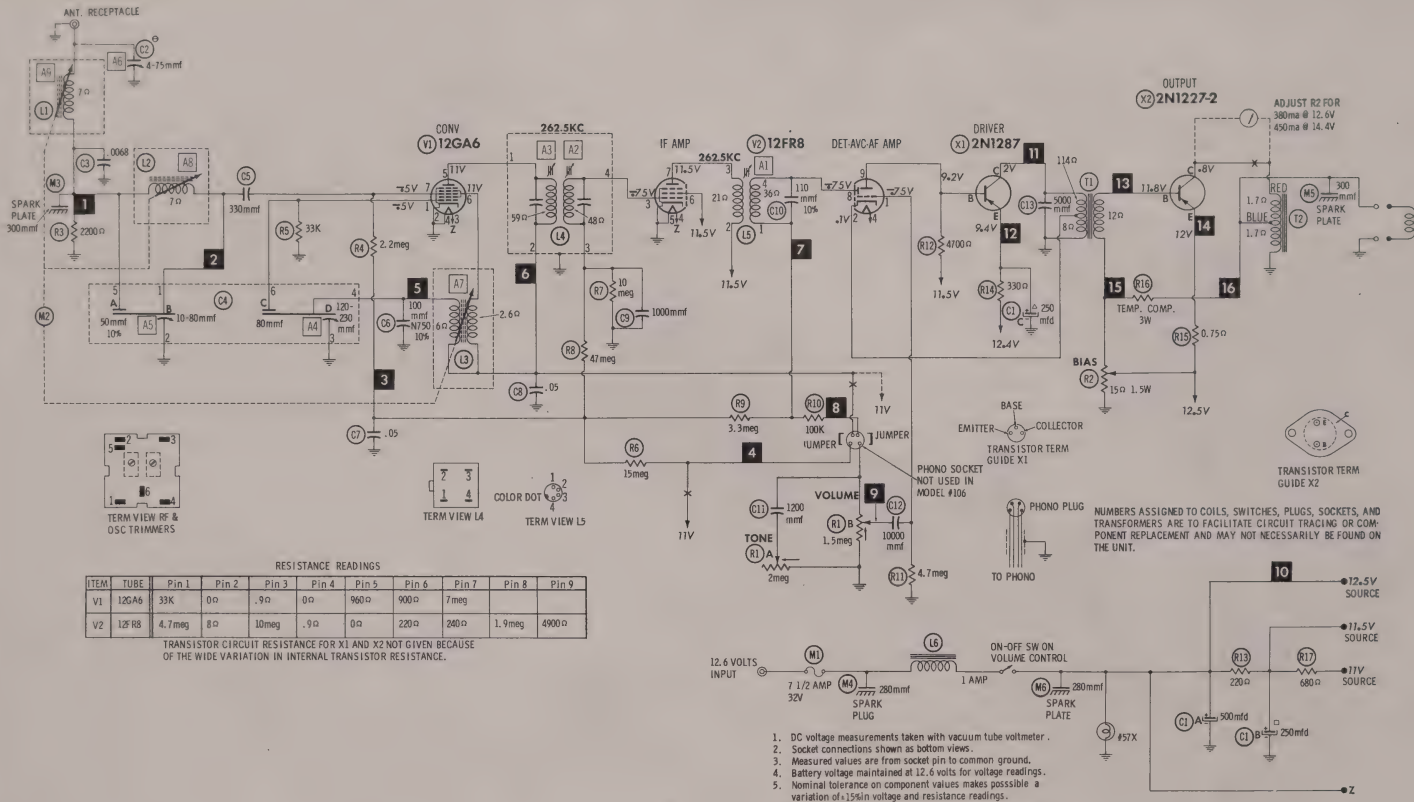
KL081

MOPAR MODELS
106, 112
MOPAR MODELS
106, 112
SET 512 FOLDER 9



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12GA6	33K	0Ω	.9Ω	0Ω	960Ω	900Ω	7meg		
V2	12FR8	4.7meg	8Ω	10meg	.9Ω	0Ω	220Ω	240Ω	1.9meg	4900Ω

TRANSISTOR CIRCUIT RESISTANCE FOR X1 AND X2 NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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MOPAR MODELS 106, 112

PARTS LIST AND DESCRIPTIONS

TUBES

◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Converter	12GA6	V2	IF Amp. -Det. - AVC-AF Amp.	12FR8

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N1287	Driver	2N591	2N362		PNP
X2	2N1227-2	Output				PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	BENDIX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	500	16	220353-13	AFH3-00-94		PWP300.4		PCLS-3026.6*	
B	■ 250	16							
C	▲ 250	16							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	EMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	4-75	#219083-3①						
C3	.0068 100V		P288N-0068	DD-682	CUB6D68	6DP-1-682	GEM-6268	6TM-D68
C4A	50 10%		NPO-DI 50	DTZ-50	C10Q5C	CCTO-510	CNO-450	10TCC-Q50
B	10-80	#219092-13						
C	80		NPO-DI 82	DTZ-82	C10Q82C	CCTO-820	CNO-482	10TCC-Q82
D	120-230							
C5	330		BPD-00033	DD-331	L10T33	CCD-331	B-333	10TS-T33
C6	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C7	.05 100V		P288N-05	DD-503	CUB2S5	1DP-2-503	GEM-415	2TM-S5
C8	.05 100V		P288N-05	DD-503	CUB2S5	1DP-2-503	GEM-415	2TM-S5
C9	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C10	110 10%		1469-00011	TCZ-110	22R5T11	CM-19B-111K	CNO-312	MS-311
C11	1200		DI-1200	DD-122	L10D12	CCD-122	B-212	10TS-D12
C12	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C13	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50

\# Bendix Part Number.
① Model 106 uses Part #219083-1.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	BENDIX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	2meg		2090405-5	F1-69				Tone
B	1.5meg			R2-68		† QJ-1286A	■ UE4141-S	Volume
C	Switch			KR-4				Power Off-On
R2	15Ω	1.5(WW)	2090181-1			110-15	PFL-15	Bias

† "Concentrikit" equivalent: K-8 kit with base elements & shafts: B13-139, P14-130 (Panel) B13-138, RI-212 (Rear 76-1 (Switch) R5 (Bushing)

■ "STA-LOC" equivalent: FA26A, RU155A, OS1937, IS2437, US41

PRINTED BOARD

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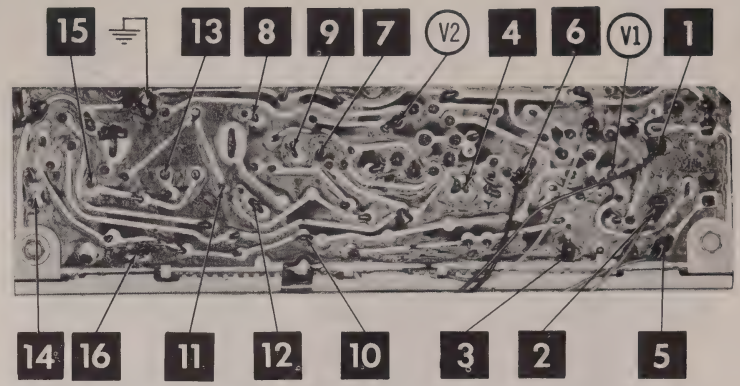
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	2200Ω	
R4	2.2meg	
R5	33K	
R6	15meg	
R7	10meg	

ITEM No.	RATING	REMARKS
R8	47meg	
R9	3.3meg	
R10	100K	
R11	4.7meg	
R12	4700Ω	

ITEM No.	RATING	REMARKS
R13	220Ω	
R14	330Ω	
R15	0.75Ω	#2090438-20 ①
R16	Temp. Comp.	#2090574-3
R17	680Ω	

\# Bendix Part Number.
① Resistance wire, approximately 9 7/8" long.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		BENDIX PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Ant. Coil	*				
L2	RF Coil	*				
L3	Osc. Coil	*				
L4	Input IF Trans.	2090907-6	BC-344	13-PH1		
L5	Output IF Trans.	2091137-1				

* Part of tuner coil assembly Part #2090131-18.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ∿)	BENDIX PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
L6	1A	.3Ω	.0015 HY	2090889-3						

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	BENDIX PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.1	1	2090433-4					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE	REPLACEMENT DATA						NOTES
	PRI.	BENDIX PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	10Ω Tap ⓐ 3-4Ω	2090849-3			TA-50①			① Mounting difference.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	BENDIX PART No.	QUAM PART No.	
SP1	6"x 9"	PM	3-4Ω	2091269-1	69A3	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			BENDIX PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	SFE	7½A 32V	SFE 7½	221633-12 (221633-3, Cap)	30707.5 (SFE 7½A 32V)	155009	SFE 7½	HRH

MISCELLANEOUS

ITEM No.	PART NAME	BENDIX PART No.	NOTES
M2	Tuner	2091083-4	Complete (Less Pointer)
M3	Spark Plate	220267-12	300mmf
M4	Spark Plate	220267-18	280mmf
M5	Spark Plate	220267-12	300mmf
M6	Spark Plate	220267-18	280mmf
	Printed Board	2091081-2	Large, Less Tubes, Model 112
	Printed Board	2091081-1	Large, Less Tubes, Model 106
	Printed Board	2091099-2	Small

CABINETS & CABINET PARTS

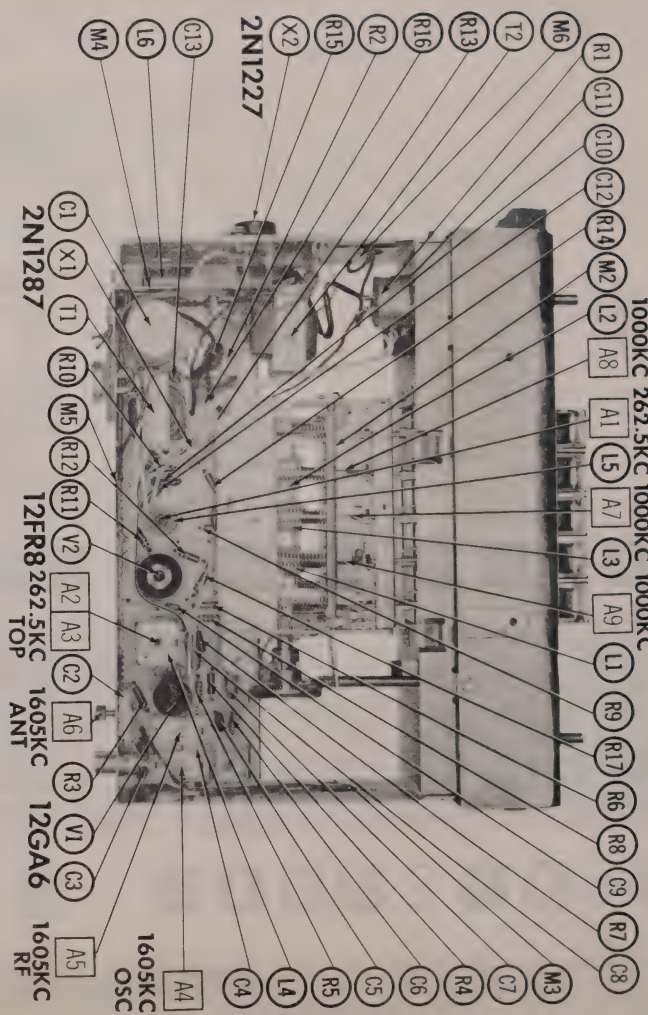
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial Glass	2091065-1	Calibrated
Pointer Ass'y.	2091080-1	Model 112
Pointer Ass'y.	2091077-1	Model 106
Knob Ass'y.	2091134-1	Model 112
Knob Ass'y.	2091132-1	Model 106
Knob	2091135-1	Tone, Model 112
Knob	2091133-1	Tone, Model 106
Pushbutton Ass'y.	2091204-1	

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire	Use BELDEN No. 8885
Bonding Strap	Use BELDEN No. 8661

CHASSIS—TOP VIEW



PHOTOFACT® Folder

MUNTZ MODELS 810B, M

MUNTZ MODELS 810B, M

MUNTZ MODELS 810B, M

TRADE NAME	Muntz Models 810B, 810M
MANUFACTURER	Muntz TV, Inc., 1000 Grey Ave., Evanston, Illinois
TYPE SET	AC Operated 4 Tube Stereo Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110 — 120 Volts AC, 60 Cycles RATING 29 Watts, .35 Amp. @ 117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER PART #PH-0020 — SEE WEBCOR 170 — PHOTOFACT SET 447 FOLDER 13 OR RECORD CHANGER MANUAL RC-12

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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K1043

PARTS LIST AND DESCRIPTIONS

TUBES

• GENERAL ELECTRIC •			• RAYTHEON • SYLVANIA •		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Channel 1 AF Amp. - Channel 2 AF Amp.	12AX7	V3	Channel 1 Output	50EH5
V2	Channel 1 AF Amp. - Channel 2 AF Amp.	12AX7	V4	Channel 2 Output	50EH5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	MUNTZ PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	200	200	CE8006		BR20025	WS342	TD-200-200	TVA-1480	Note 1
B	200	200			BR20025	WS342	TD-200-200	TVA-1480	Note 1
C2	100	150	CE0038	PRS1510	BR10015	TC493	TD-100-150	TVA-1420	Note 1
C3	8	25	CE0018	PRS1405	BBR8-150	TC41	TD-8-150	TVA-1405	
C4	8	25	CE0018	PRS1405	BBR8-150	TC41	TD-8-150	TVA-1405	
C5	8	25	CE0018	PRS1405	BBR8-150	TC41	TD-8-150	TVA-1405	
C6	8	25	CE0018	PRS1405	BBR8-150	TC41	TD-8-150	TVA-1405	

Note 1. In some versions, C1 and C2 may be one unit (200-60-200mfd) Part #CE-8004.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C7	.047 600V		P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47
C8	.0022 600V 10%		V84C6D22-10%		PM6D22	6DP-1-222	GP222	6TM-D22
C9	.022 200V 10%		V84C2S22-10%		PM6S22	4DP-2-223	GEM-16122	2TM-S22
C10	.022 200V 10%		V84C2S22-10%		PM6S22	4DP-2-223	GEM-16122	2TM-S22
C11	100		SI 100	D6-101	L10T1	CCD-101	GP310	10TS-T10
C12	.0022 600V 10%		V84C6D22-10%		PM6D22	6DP-1-222	GP222	6TM-D22
C13	2000		BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C14	.0022 600V 10%		V84C6D22-10%		PM6D22	6DP-1-222	GEM-16122	6TM-D22
C15	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C16	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C17	.0022 600V 10%		V84C6D22-10%		PM6D22	6DP-3-222	GP222	6TM-D22
C18	.022 200V 10%		V84C2S22-10%		PM6S22	4DP-2-223	GEM-16122	2TM-S22
C19	.022 200V 10%		V84C2S22-10%		PM6S22	4DP-2-223	GEM-16122	2TM-S22
C20	100		SI 100	D6-101	L10T1	CCD-101	GP310	10TS-T10
C21	.0022 600V 10%		V84C6D22-10%		PM6D22	6DP-1-222	GEM-16122	6TM-D22
C22	2000		BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C23	.0022 600V 10%		V84C6D22-10%		PM6D22	6DP-1-222	GEM-16122	6TM-D22
C24	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C25	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C26	.047 600V		P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47
C27	.047 600V		P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MUNTZ PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	1meg	½	VC-8011	BT-71			FBI6T55	Volume, Channel 2
	500K Tap							
B	1meg	½		STR-71			RUI6T55	Volume, Channel 1
	500K Tap							
C	Shaft			Not Req.			CS3500	
R2A	500K	½	VC-8012	B-59	AD47-500K-S		FA55L	Bass, Channel 2
B	500K	½		SR-59	Not Req.		RU55L	Bass, Channel 1
C	Shaft			Not Req.	KSS-3		CS3500	
R3A	500K	½	VC-8013	B-59	AD47-500K-S		FA55L	Treble, Channel 2
B	500K	½		SR-59	Not Req.		RU55L	Treble, Channel 1
C	Shaft			Not Req.	KSS-3		CS3500	
D	Switch			KR-1	SWE-12		US-41	Power Off-On
R4A	500K	½	VC-8012	B-59	AD47-500K-S		FA55L	Balance, Channel 1
B	500K	½		SR-59	Not Req.		RU55L	Balance, Channel 2
C	Shaft			Not Req.	KSS-3		CS3500	

CHASSIS—BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R5	82K	
R6	470K	
R7	100K	
R8	470Ω	
R9	100K	
R10	47K	
R11	22K	
R12	100K	
R13	470K	

ITEM No.	RATING	REMARKS
R14	47K	
R15	2700Ω	
R16	82Ω	
R17	82K	
R18	470K	
R19	100K	
R20	470Ω	
R21	100K	
R22	47K	

ITEM No.	RATING	REMARKS
R23	22K	
R24	100K	
R25	470K	
R26	47K	
R27	2700Ω	
R28	82Ω	
R29	10K	(1000Ω) *
R30	470Ω 7W	IRC#PW10-470Ω
R31	5Ω 7W	IRC#FR-5Ω ①

* Alternate Value. ① Fuse Type.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MUNTZ PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2600Ω	6-8Ω	TO-0053	A-2902	AU-604	A-3849	24S64	S-53X	
T2	2600Ω	6-8Ω	TO-0053	A-2902	AU-604	A-3849	24S64	S-53X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MUNTZ PART No.	QUAM PART No.	
SP1	8"	PM	6-8Ω	SK-0023-3	8A21Z6.8	
SP2	8"	PM	6-8Ω	SK-0023-3	8A21Z6.8	

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	MUNTZ PART No.	ITT PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.080A	CX-0037 *	RE504 *	1N1764 *	F6 *	SR500 *	* Silicon Type

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA								
	MUNTZ PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M2		80TS (TB)		96				12TH5	

PHONO NEEDLE

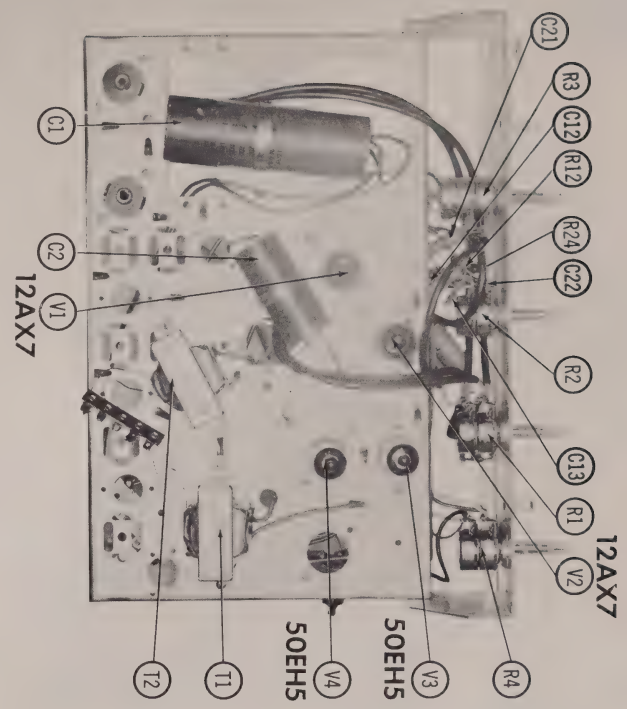
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA		REMARKS
	MUNTZ PART No.	JENSEN PART No.	
M3	(78 RPM)	CRA-57 † or CRA-57D ♦	† Jewel ♦ Diamond
	(LP)	CRA-57X † or CRA-57XD ♦	

MISCELLANEOUS

ITEM No.	PART NAME	MUNTZ PART No.	NOTES
M4	Motor		Phono Drive

CHASSIS—TOP VIEW



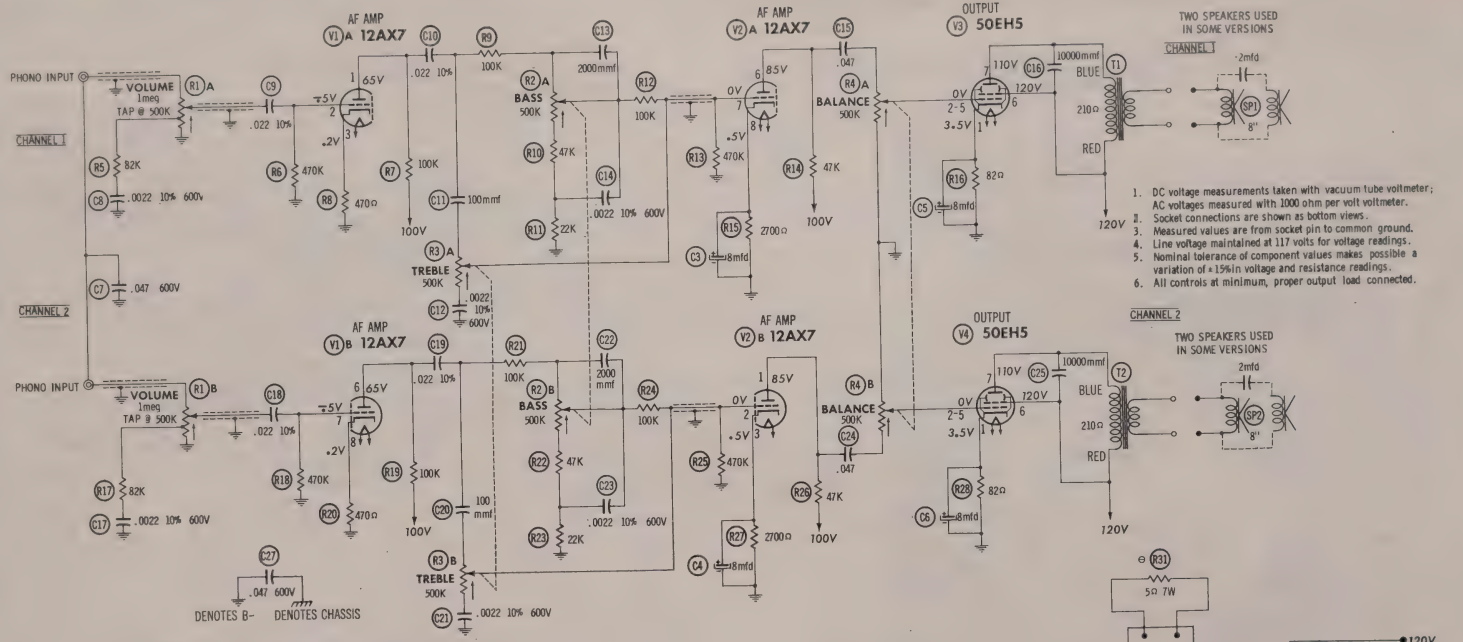
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	KB-8005	Loudness, Bass, Treble, Balance
Cabinet	CW-0110	Walnut
Cabinet	CW-0110-2	Mahogany
Cabinet	CW-0110-4	Blonde
Leg	AS-8008	Brass 5"

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†110K	470K	470Ω	50Ω	0Ω	†110K	470K	470Ω	25Ω
V2	12AX7	†57K	100K	2700Ω	50Ω	100Ω	†57K	100K	2700Ω	75Ω
V3	50EH5	82Ω	250K	200Ω	100Ω	250K	†475Ω	†685Ω		
V4	50EH5	82Ω	250K	300Ω	200Ω	250K	†475Ω	†685Ω		

† MEASURED FROM OUTPUT OF M1.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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MUNTZ MODELS 810B, M

PHOTOFACT® Folder

**SARKES TARZIAN
MODEL 723-502**

SARKES TARZIAN
MODEL 723-502

SARKES TARZIAN
MODEL 723-502

TRADE NAME	Sarkes Tarzian Model 723-502
MANUFACTURER	Sarkes Tarzian, Inc., East Hillside Drive, Bloomington, Indiana
TYPE SET	AC-DC Operated Five Tube FM Receiver
POWER SUPPLY	110 - 120 Volts AC-DC RATING 27 Watts, .26 Amp. @117 Volts AC
TUNING RANGE—FREQ. MOD.	88 — 108MC

TUNING DRIVE CORD STRINGING

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Preset R2 fully counterclockwise.

Use only enough generator output to provide a usable indication.

Suggested Alignment Tools:
A1 thru A4, A10, A11.... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545
A5..... GENERAL CEMENT #8721, 8722
WALSCO #2519
A6..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A7, A8, A9..... GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291
WALSCO #2515, 2520, 2522, 2523, 2531, 2532, 2534, 2537, 2538

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .001mfd to point Ⓐ. Low side to chassis.	10.7MC (400~FM Mod.)	Point of non-interference.	Across voice coil. Vert. amp. of scope to point Ⓑ. Low side to chassis.	A1, A2, A3, A4	Connect clip lead from point Ⓒ to chassis. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
2.	High side thru 75Ω to antenna feed thru. Low side to chassis.	87.5MC	Tuning gang fully closed.	"	A5, L2, A6	Preset A7 for ½" screw length above chassis and A8 and A9 one turn from tight. Adjust A5, L2, and A6 for maximum output.
3.	"	108MC	108MC	"	A7, A8, A9	Adjust for maximum output.
4.	"	108MC	108MC	"	A10	Adjust A10 for maximum output. Retouch A1, A2, A3 and A4 for symmetrical response on scope.
5.	"	87.5MC	Tuning gang fully closed.	"		Retouch A5 for maximum output.
6.	"	108MC	108MC	"		Retouch A7, A8 and A9 for maximum output.
7.	"	"	"	"	A11	Remove clip lead from point Ⓒ. Adjust A11 for maximum output with 100 microvolt signal input.
8.	"	"	"	"	R2	Reduce signal input to 20 microvolts. Adjust R2 for maximum output.

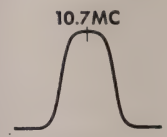
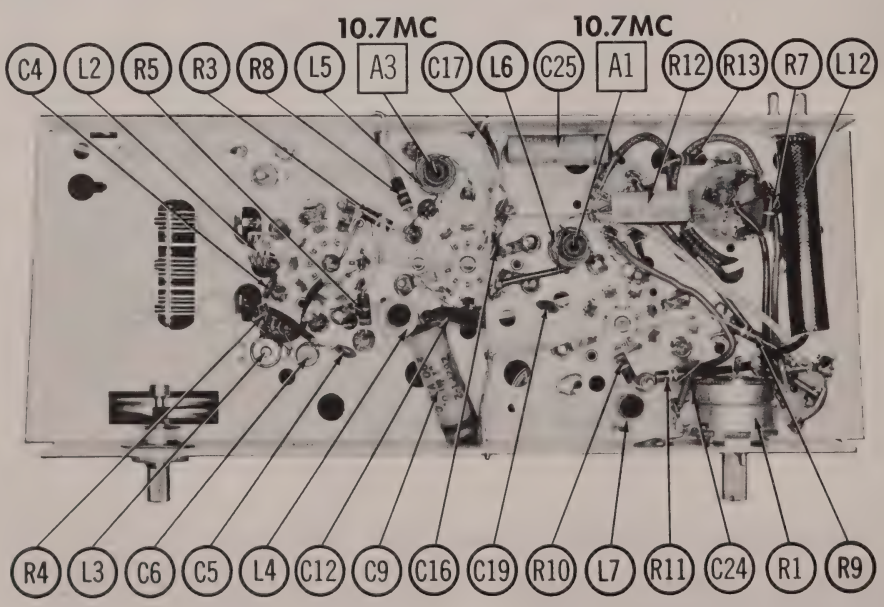


FIG. 1



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	RF Amp. -Converter	19CL8A	V4	Output	35EH5
V2	1st IF Amp. -2nd IF Amp.	19EA8	V5	Rectifier	35W4
V3	Detector	12BN6			

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Sarkes Tarzian PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■60	150	18-039-1		XB0165	FP216.6	TMD-2120	TVL-2435	
B	▲60	150			NLW100-6	TT6X100	ML100-3	TE-1059.5	
C	100	3							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

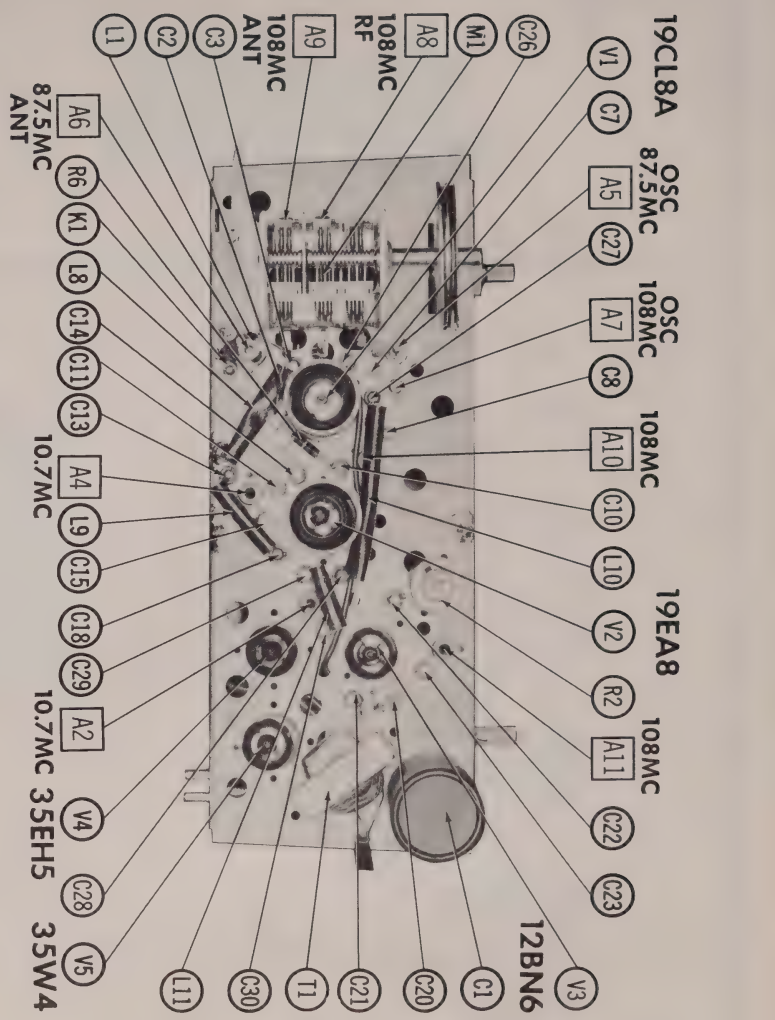
ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	47 10%		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C3	1000		EF-001	MFT-1000		CCF-102	CT280A	
C4	22 NPO 10%		NPO-DI 22	DTZ-22	C10Q22C	CCTO-220	CNO-422	10TCC-Q22
C5	15 N470 5%	#13-235-150				*		
C6	1-7	#13-1620-11		829-7				
C7	12 NPO 10%	#13-261-120						
C8	12 NPO 10%	#13-261-120						
C9	.1 200V 10%		V84C2P1-10%		PM2P1	2DP-3-104	GEM-201	2TM-P1
C10	1000		EF-001	MFT-1000		CCF-102	CT280A	
C11	15 NPO 5%	#13-261-150						
C12	100 5%			DTZ-100	C10T1C	CM-19B-101J	CNO-310	10TCC-T10
C13	1000		EF-001	MFT-1000		CCF-102	CT280A	
C14	1000		EF-001	MFT-1000		CCF-102	CT280A	
C15	9 NPO 5%	#13-261-909						
C16	47 10%		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C17	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C18	1000		EF-001	MFT-1000		CCF-102	CT280A	
C19	47 10%		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C20	12 NPO 10%	#13-261-120						
C21	1000		EF-001	MFT-1000		CCF-102	CT280A	
C22	1000		EF-001	MFT-1000		CCF-102	CT280A	
C23	1000		EF-001	MFT-1000		CCF-102	CT280A	
C24	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C25	.002 400V 10%		V84C6D2-10%			6DP-1-102	GP220	6TM-D2
C26	1000		EF-001	MFT-1000		CCF-102	CT280A	
C27	1000		EF-001	MFT-1000		CCF-102	CT280A	
C28	1000		EF-001	MFT-1000		CCF-102	CT280A	
C29	1000		EF-001	MFT-1000		CCF-102	CT280A	
C30	1000		EF-001	MFT-1000		CCF-102	CT280A	

Sarkes Tarzian Part Number.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Sarkes Tarzian PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	12-6-1-1	AB-60		Q13-133	U48	Volume
B	Shaft			AK-19		Not Req.	Not Req.	
C	Switch			KR-1		76-1	US-26	Power Off-On
R2	400Ω	2(WW)	42-001-1					Sensitivity

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	470K	
R4	33K	
R5	47Ω	
R6	1.0meg	

ITEM No.	RATING	REMARKS
R7	1.2meg	
R8	470K	
R9	10K	
R10	470Ω	

ITEM No.	RATING	REMARKS
R11	100K	
R12	1000Ω 3W	IRC#PW5-1K
R13	68Ω	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Sarkes Tarzian PART No.	REPLACEMENT DATA
K1	Antenna Filter	400mmf, .6-1meg	37-019-1	Centralab RC-471

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		Sarkes Tarzian PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Ant. Trans.	28-001-1				
L2	RF Coil	28-004-1				
L3	Osc. Coil	28-002-1				
L4	1st IF Trans.	28-003-4				
L5	2nd IF Trans.	28-003-2				
L6	3rd IF Trans.	28-003-2				
L7	Quadrature Coil	28-003-4				
L8	RF Choke	22-031-6	SW-630	4606		2.8uh
L9	RF Choke	22-031-8	SW-630	4606		2.8uh
L10	Fil. Choke	22-031-14	SW-630	4606		2.8uh
L11	Fil. Choke	22-031-12	SW-630	4606		2.8uh
L12A	Line Choke	22-030	BC-564	4608		3.5uh
B	Line Choke		BC-564	4608		3.5uh

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Sarkes Tarzian PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	4700Ω	3-4Ω	24-019-1	A-3026	AU-601①	A-3877①	24S48	S-6X	① Drill New Mounting Hole

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Sarkes Tarzian PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	57-002-1	4A07	

MISCELLANEOUS

ITEM No.	PART NAME	Sarkes Tarzian PART No.	NOTES
M1	Tuning Cap.	19-014-1	FM, 3 Gang

CABINETS & CABINET PARTS

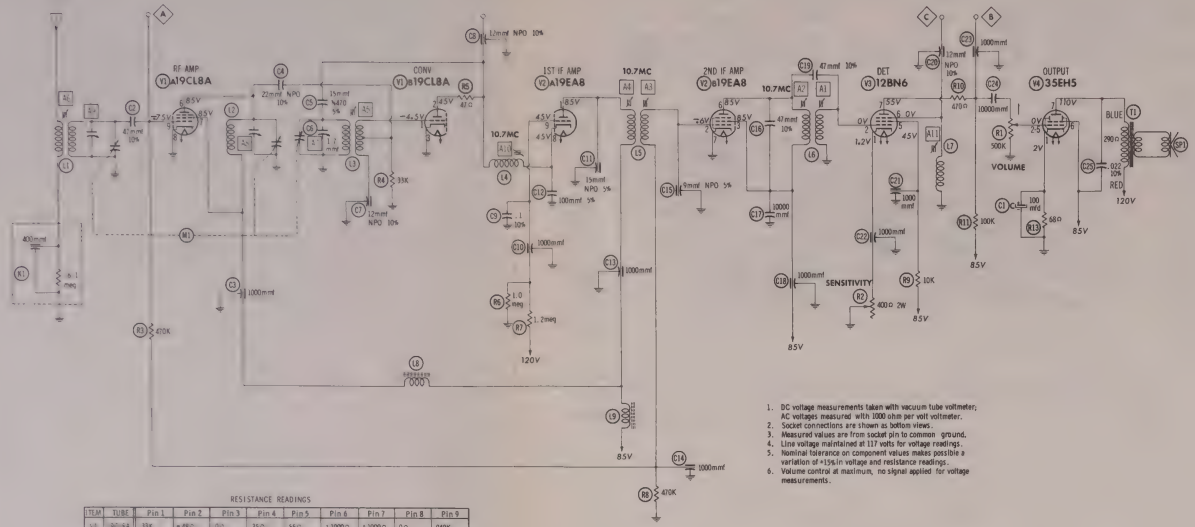
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial	74-011-1	
Knob	74-010-1	Tuning, Volume
Cabinet	74-008	Back
Cabinet	74-009	Front

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



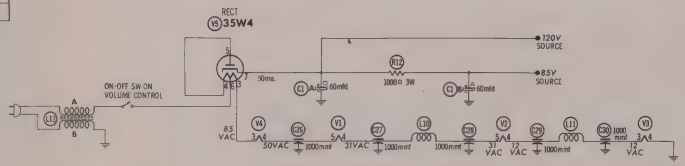
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	a19CL8A	33K	▪480Ω	0Ω	150Ω	55Ω	▪1000Ω	▪1000Ω	0Ω	940K
V2	19EA8	▪1000Ω	470K	▪1000Ω	150Ω	35Ω	▪1000Ω	0Ω	INF	1meg
V3	12BN6	320Ω	5Ω	15Ω	0Ω	▪11K	5Ω	▪100K		
V4	35EH5	68Ω	0Ω	100Ω	55Ω	0Ω	▪1000Ω	▪290Ω		
V5	35W4	TP	NC	100Ω	145Ω	145Ω	135Ω	1		

1 THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
▪ MEASURED FROM PIN 7 OF V5.
■ MEASURED FROM PIN 8 OF V2.

NC NO CONNECTION
TP TIE POINT



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SARKES TARZIAN
MODEL 723-502

PHOTOFACT® Folder

SHERWOOD
MODEL S-360

SHERWOOD
MODEL S-360

SHERWOOD
MODEL S-360

TRADE NAME	Sherwood Model S-360		
MANUFACTURER	Sherwood Electronic Laboratories, Inc., 4300 N. California Ave., Chicago 18, Illinois		
TYPE SET	AC Operated 6 Tube Audio Amplifier		
POWER SUPPLY	110-120 Volts AC, 60 Cycles	RATING	110 Watts, 1.1 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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KX031

SET 512 FOLDER 12

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (• GENERAL ELECTRIC • RAYTHEON • SYLVANIA •)
V1	AF Amp. - Phase Inv.	7199
V2	Output	7189 (6FQ5/EL84) *
V3	Output	7189 (6FQ5/EL84) *
V4	Output	7189 (6BQ5/EL84) *
V5	Output	7189 (6BQ5/EL84) *
V6	Rectifier	5AR4/GZ34

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA SHERWOOD PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	● 20	500				FP399.55	TMQ-4782	TVLS-3966 *	
B	▲ 40	500				TC60		TVA-1601	
C	■ 40	500							
D	5	350							
C2	50	50	PRS1350	BR505		TC39	TD-50-50	TVA-1308	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C4	27 NPO 10%		NPO-DI 25	TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
C5	15 N75 10%							
C6	.068 600V 10%	Note 1	V84C8S68-10%		PM6S68	6DP-4-683		6TM-S68
C7	.068 600V 10%	Note 1	V84C8S68-10%		PM6S68	6DP-4-683		6TM-S68
C8	.022 400V		P848N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C9	120 5%		1469-00012	TCZ-120	22R5T12	CM-19B-121J	CNO-312	MS-312
C10	33 10%		1469-000033	TCZ-33	22R5Q33	CM-19B-330K	CNO-433	MS-433
C11A	2000 1400V		DAC-27	DD30-202	HVC20D2	16DP-1-202	UAC-220	BL-D20
B	2000 1400V		DAC-27	DD30-202	HVC20D2	16DP-1-202	UAC-220	BL-D20

Note 1. R6 and R7 are matched within 3%.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SHERWOOD PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	A670B9	AB-60	A47-500K-Z	B13-133	TA55L	Gain
B	Shaft			AK-1	FKS-1/4	TM4	Not Req.	
R2A	25K	½	A670B10	AB-26	B47-25K-S	B11-120	TA253L	Tube Balance
B	Shaft		-	AK-1	Not Req.	TM4	Not Req.	

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

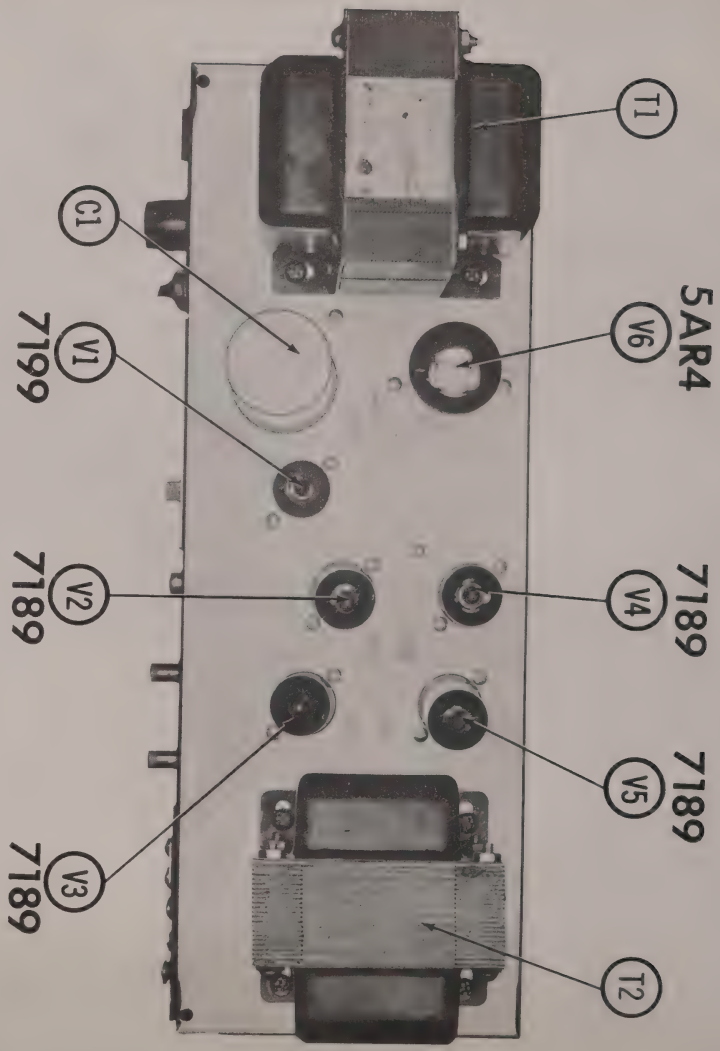
ITEM No.	RATING	REMARKS
R3	220K	
R4	1200Ω	
R5	1meg	
R6	18K	
R7	680K	
R8	47K 1W	
R9	47K 1W	
R10	68Ω	

ITEM No.	RATING	REMARKS
R11	150K	
R12	1000Ω	
R13	1000Ω	
R14	220Ω	
R15	6.8Ω 1W	
R16	150K	
R17	1000Ω	
R18	1000Ω	

ITEM No.	RATING	REMARKS
R19	150K	
R20	150K	
R21	27K 2W	
R22	33Ω 7W	IRC#PW7-33Ω
R23	220Ω	
R24	100K	Note 1
R25	.82Ω	
R26	.82Ω	

Note 1. Not used in some versions.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA: SHERWOOD PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
	PRI.	SEC. 1	SEC. 2							
T1	117V @ 1.1A	700 VCT @ .100A Tap @ 18V @ .001A	5V @ 1.9A	B922B4-1						
	SEC. 3	SEC. 4	SEC. 5							
	6.3 VCT @ 3.6A									

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA: SHERWOOD PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
	PRI.	SEC.							
T2	4600Ω CT Tap @ 280Ω CT	16Ω Tap @ 8Ω, 4Ω	B920B4						

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					
	CURRENT (Measured)	SHERWOOD PART No.	ITT PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.001A	*			12 *		* Selenium

FUSES

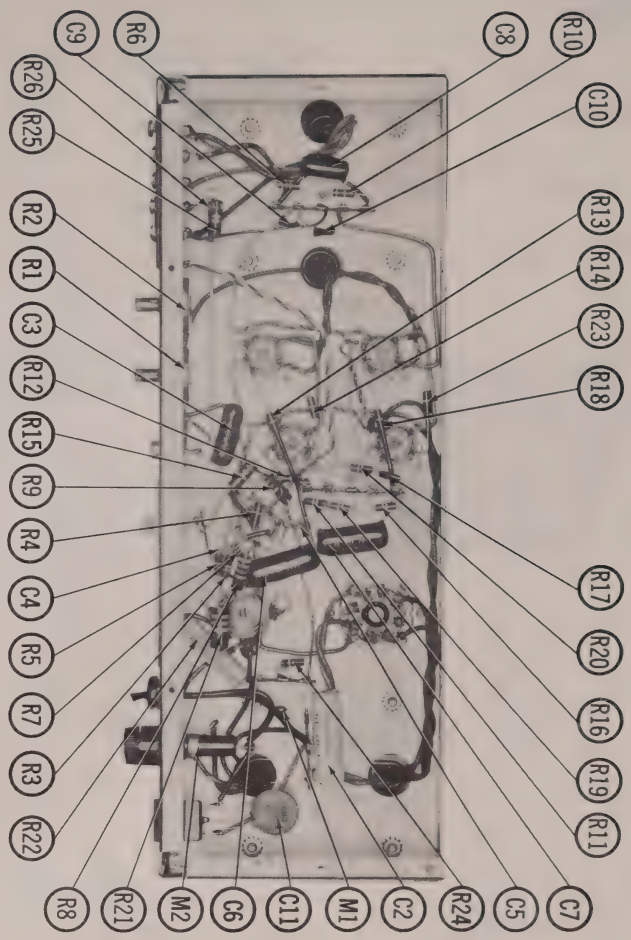
ITEM No.	TYPE	RATING	REPLACEMENT DATA: SHERWOOD PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	1½A 125V S/B			31301.5 (3AG 1½A 125V S/B)	342001	MDL 1½	HKP

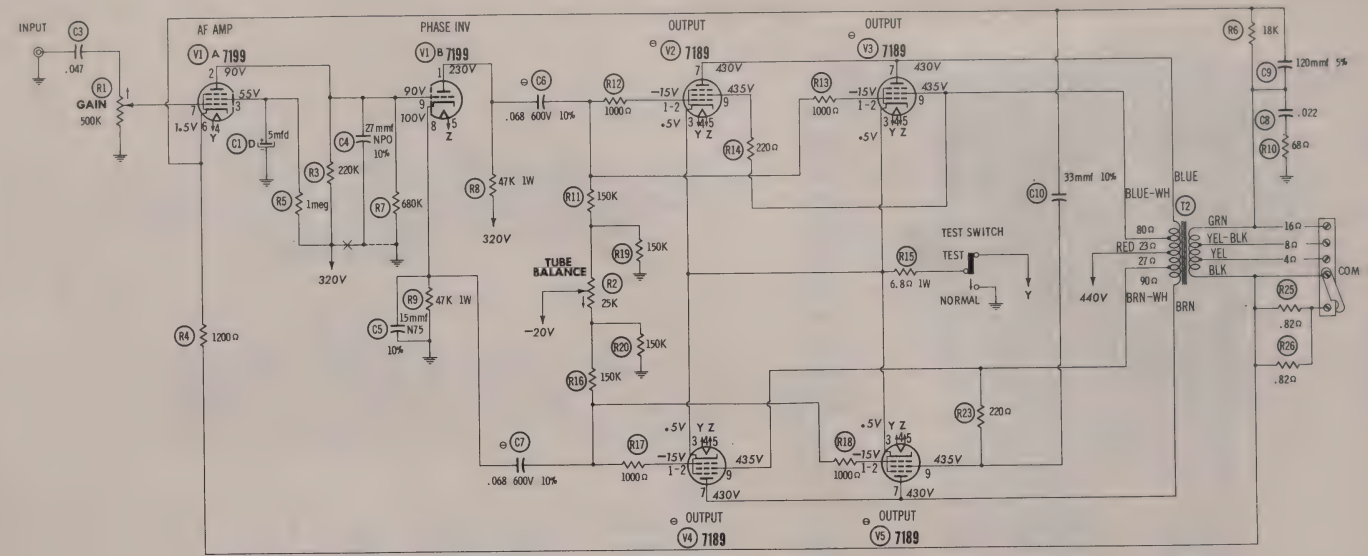
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of components values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

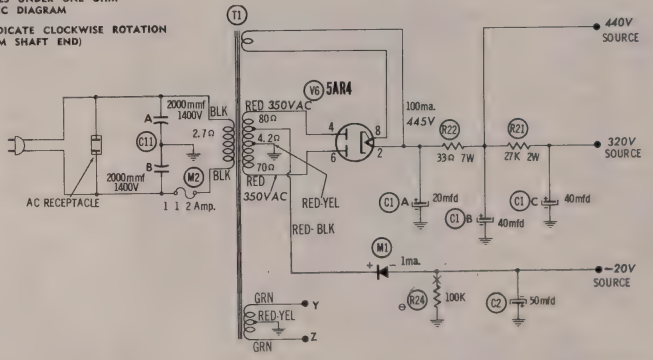
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	7199	†75K	†250K	†1meg	.1Ω	.1Ω	1200Ω	0Ω	47K	†250K
V2	7189	NC	230K	6.8Ω	.1Ω	.1Ω	NC	†135Ω	NC	†55Ω
V3	7189	NC	230K	6.8Ω	.1Ω	.1Ω	NC	†135Ω	NC	†55Ω
V4	7189	NC	230K	6.8Ω	.1Ω	.1Ω	NC	†150Ω	NC	†60Ω
V5	7189	NC	230K	6.8Ω	.1Ω	.1Ω	NC	†150Ω	NC	†60Ω
V6	5AR4 GZ34	NC	¶	NC	84Ω	NC	70Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V6. NC NO CONNECTION



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SHERWOOD MODEL S-360

PHOTOFACT® Folder with CIRCUITRACE®

TOSHIBA
MODEL 7TP-352S

TOSHIBA
MODEL 7TP-352S

TRADE NAME	Toshiba Model 7TP-352S
IMPORTER	Transistor World Corp., 52 Broadway, New York 4, N. Y.
TYPE SET	Battery Operated Transistorized Portable BC-SW Receiver
POWER SUPPLY	9 Volts DC
RATING	8MA @ 9 Volts DC (No Signal, Min. Volume)
	10MA @ 9 Volts DC (Signal, Normal Volume)
TUNING RANGE—BROADCAST	530 – 1700KC
SHORT WAVE	3.8 – 12.5 MC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1, A2, A3... GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291
WALSCO #2515, 2520, 2522, 2523, 2531, 2532, 2534, 2537, 2538
A4..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A5. A7..... GENERAL CEMENT #5000, 5003, 5066, 8271, 8272, 8276, 8277, 8290, 8609, 8722, 9150, 9298
WALSCO #2515, 2516, 2518, 2519, 2525, 2541

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400∿ Mod.)	(MW) Tuning gang fully closed.	Across voice coil.	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	530KC	"	"	A4	"
3.	"	1700KC	(MW) Tuning gang fully open.	"	A5	Adjust for maximum output. Repeat Steps 2 and 3.
4.	"	600KC	(MW) 600KC Signal.	"	A6	Adjust for maximum output.
5.	"	1400KC	(MW) 1400KC Signal.	"	A7	"
6.	"	3.8MC	(SW) Tuning gang fully closed.	"	A8	"
7.	"	12.5MC	(SW) Tuning gang fully open.	"	A9	Adjust for maximum output. Repeat Steps 6 and 7.
8.	"	4.0MC	(SW) 4.0MC Signal.	"	A10	Adjust for maximum output.
9.	"	9.5MC	(SW) 9.5MC Signal.	"	A11	"

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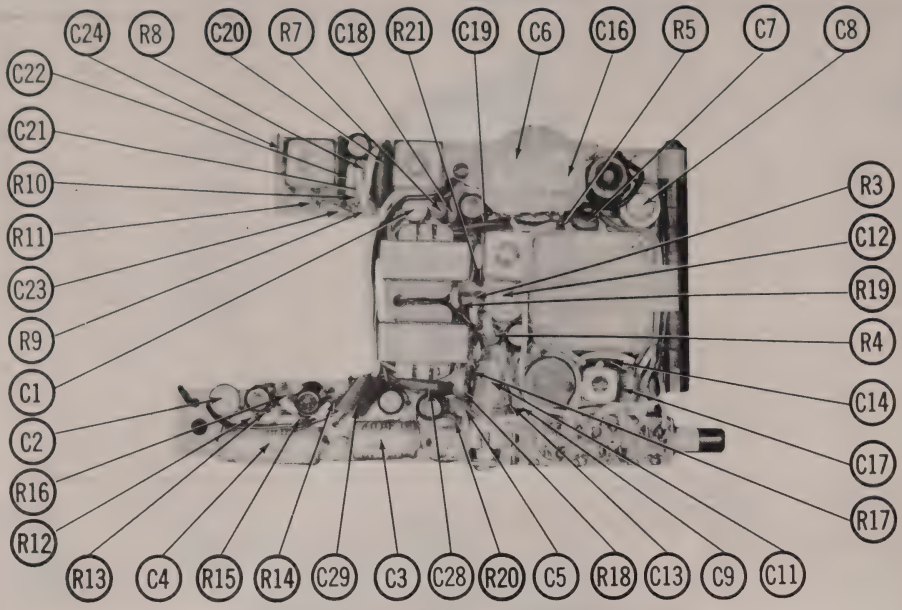
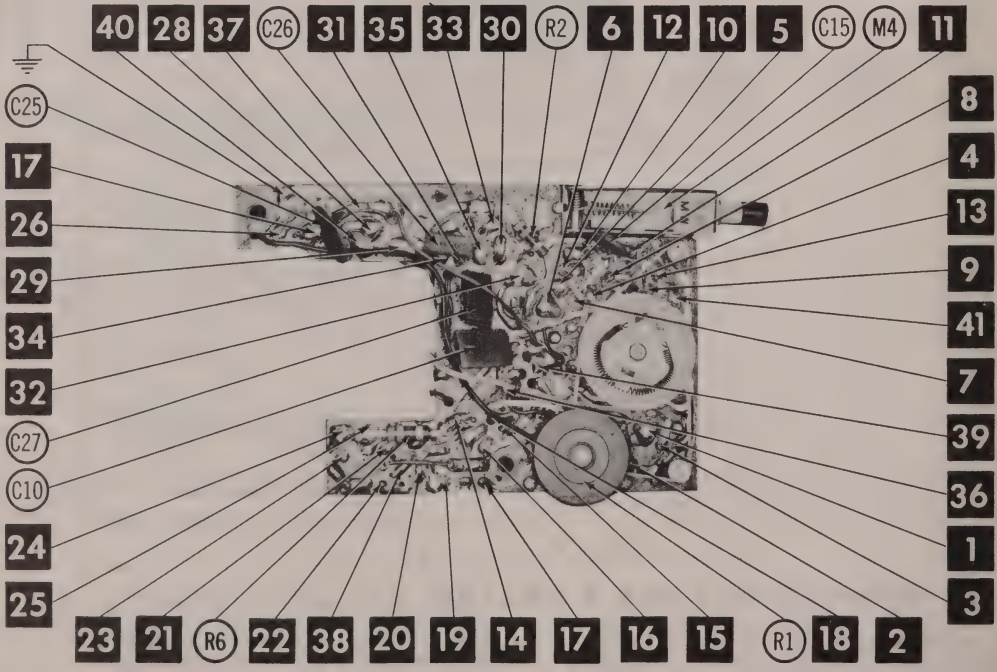
KF089

SET 512 FOLDER 13



CHASSIS TOP VIEW-CAPACITOR AND RESISTOR IDENTIFICATION



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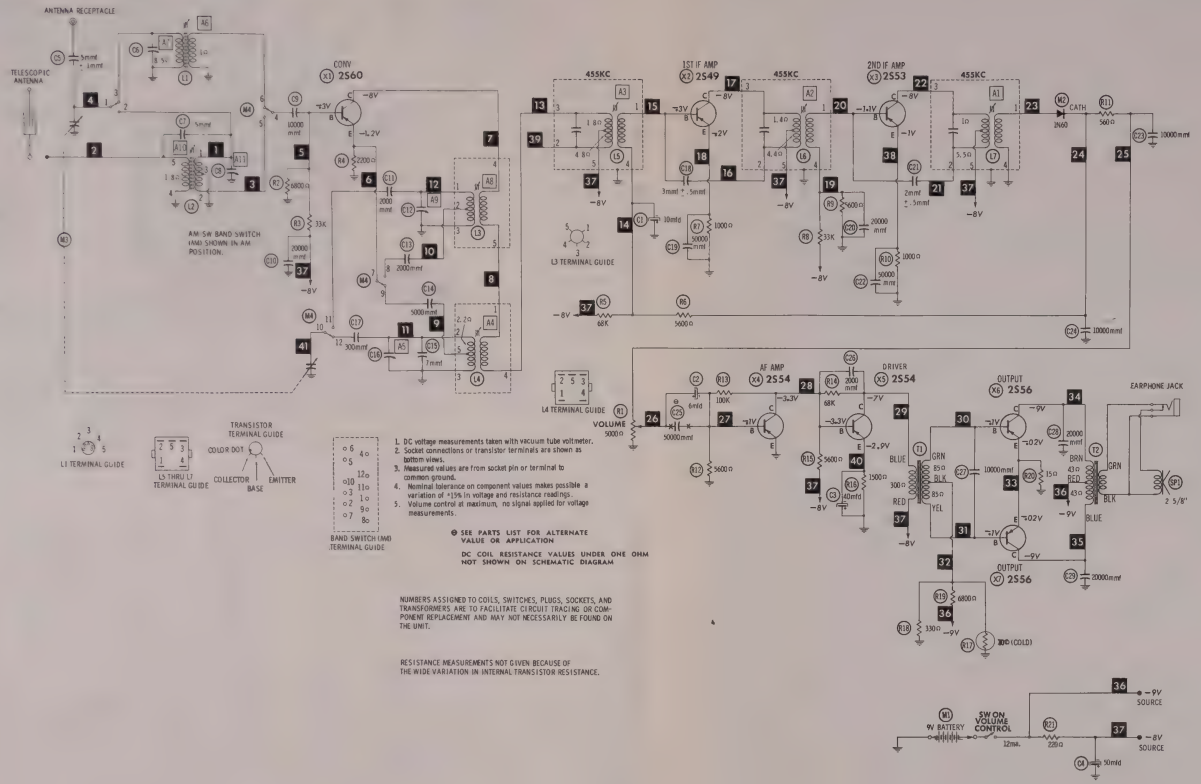

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

⊕ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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TOSHIBA
MODEL 7TP-3525

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2S60	Converter				PNP
X2	2S49	1st IF Amplifier			2N410	PNP
X3	2S53	2nd IF Amplifier	2N410	2N483	2N410	PNP
X4	2S54	AF Amp.	2N408	2N362	2N408	PNP
X5	2S54	Driver	2N408	2N362	2N408	PNP
X6	2S56	Output	2N408	2N632	2N408	PNP } Matched
X7	2S56	Output	2N408	2N632	2N408	PNP } Pair

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	TOSHIBA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	10	3		XPP-3010	NLW10-3	TT3X10	ML10-6	TE-1053	
C2	6	3		XPP-3006	NLW8-6	TT10X6	ML6-6	TE-1052. 3	
C3	40	3	3M40E	XPP-3040	NLW40-3	TT3X40	ML40-6	TE-1057	
C4	50	10	10M50E	XPP-10050	NLW50-10	TT10X50	ML50-15	TE-1119	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	5 ± 1mmf		NPO-DI 5	DTZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C6								
C7	5		NPO-DI 5	DTZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C8								
C9	10000		C80V103AM	DDM-103	H-05S1		TA-110	TG-S10
C10	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C11	2000		SI 2000	DM-202	BYA10D2	CCD-202	B-220	5HK-D20
C12								
C13	2000		SI 2000	DM-202	BYA10D2	CCD-202	B-220	5HK-D20
C14	5000		C80V502AM	DDM-502	H-05D5	CCD-502	TA-250	TG-D50
C15	7		NPO-DI 6. 8	DTZ-6R8	C10V7C	CCTO-6R8	CNO-568	10TCC-V6. 8
C16								
C17	300		SI 300	DM-301	L10T3	CCD-301	GP330	10TS-T30
C18	3 ± .5mmf		NPO-DI 3. 3	DTZ-3R3	C10V3C	CCTO-3R3	CNO-533	10TCC-V33
C19	50000		C80V503AM	DDA-503	H-05S5		TA-150	TG-150
C20	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-120
C21	2 ± .5mmf		NPO-DI 2. 2	DTZ-2R2	C10V2C	CCTO-2R2	CNO-522	10TCC-V22
C22	50000		C80V503AM	DDA-503	H-05S5		TA-150	TG-S50
C23	10000		C80V103AM	DDM-103	H-05S1		TA-110	TG-S10
C24	10000		C80V103AM	DDM-103	H-05S1		TA-110	TG-S10
C25	50000	Note 1	C80V503AM	DDA-503	H-05S5		TA-150	TG-S50
C26	2000		BPD-002	DM-202	BYA10D2	CCD-202	B-220	5HK-D20

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C27	10000		C80V103AM	DDM-103	H-05S1		TA-110	TG-S10
C28	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C29	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20

Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TOSHIBA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/4	40571T	B16-214				Volume & Switch

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	6800Ω	
R3	33K	
R4	2200Ω	
R5	68K	
R6	5600Ω	
R7	1000Ω	
R8	33K	

ITEM No.	RATING	REMARKS
R9	5600Ω	
R10	1000Ω	
R11	560Ω	
R12	5600Ω	
R13	100K	
R14	68K	
R15	5600Ω	

ITEM No.	RATING	REMARKS
R16	1500Ω	
R17	10Ω Cold	#M-8601
R18	330Ω	
R19	6800Ω	
R20	15Ω	
R21	220Ω	

Toshiba Part Number.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		TOSHIBA PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	SW Ant. Trans.	LH-211				
L2	Loopstick	LH-212				
L3	SW Osc. Coil	LH-158				
L4	BC Osc. Coil	LH-153				
L5	1st IF Trans.	IT-1038				
L6	2nd IF Trans.	IT-1039				
L7	3rd IF Trans.	IT-1040				

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	TOSHIBA PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1. 7	1	DT-0617					

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	TOSHIBA PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	250Ω CT	8-10Ω	MT-0679						

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	TOSHIBA PART No.	QUAM PART No.	
SP1	2 5/8"	PM	8-10Ω			

BATTERIES

ITEM No.	VOLTAGE	TOSHIBA PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V	R006	P-6						

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		TOSHIBA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N60		1N60	1N60	Detector (Pigtail)

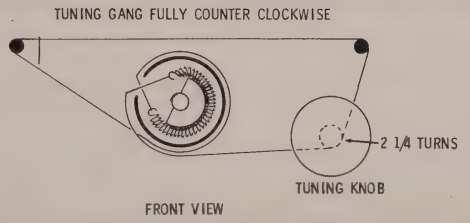
MISCELLANEOUS

ITEM No.	PART NAME	TOSHIBA PART No.	NOTES
M3	Tuning Cap.		2 Gang
M4	Switch		Band

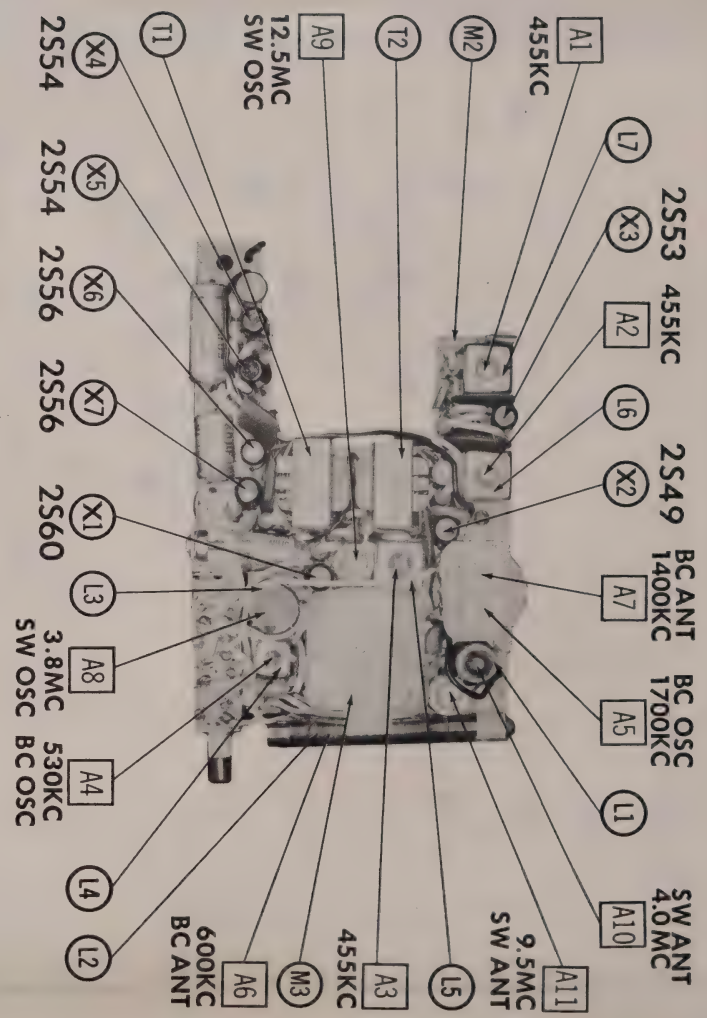
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

DIAL CORD STRINGING



CHASSIS—TOP VIEW



PHOTOFACT® Folder

INDEX

A cumulative index is included as a part of this Folder. Upon finding that a new tube is not listed on the roll chart of a tester covered in this service, refer to the latest Tube Tester Data Index to determine in which PHOTOFACT Set the data was published. If listed, reference to that Folder will provide the necessary data.

TUBE TYPES	JACKSON 598, 648, and 658	TUBE TYPES	JACKSON 598, 648, and 658	TUBE TYPES	JACKSON 598, 648, and 658
1H2	500	6EW7	504	13EM7	512
1N2	500	6FE5	500	14GT8	500
2ES5	500	6FE8	500	15EW6	508
2EV5	512	6FG5	500	17EW8	508
2FY5	512	6FQ5	512	22DE4	500
3DG4	500	6FV8	504	34GD5	508
3EV5	512	6FW8	500	35GL6	500
6CD7	512	6FY5	508	50BM8	504
6CW7	504	6GM6	500	50FE5	500
6EH7	500	6GY8	504	7167	508
6EJ7	500	7DJ8	504	7408	500
6EM7	500	9EF6	508	7543	500
6EU7	500	10EW7	504	7591	504
6EV5	500	12DW7	504	7695	512
6EV7	504				

JACKSON MODEL 598

SET 512

SUPPLEMENTS LATEST ROLL CHART 598-2

Tube Type	A.	B.	C.	Fil. Cont.	D.	E.	F.	G.
2EV5	2.5	3Y	2	4	5	1	6	30
2FY5	2.5	3Z	1	4	5	2		37
3EV5	3.0	3Y	2	4	5	1	6	30
6CD7	6.3	2		7	3	4Z		55
		2			6	4Z		62
		2			5			0
			Visual Test					
6FQ5	6.3	3Z	7	4	5	2		42
13EM7	12.6	8		7	5	4Z		54
		8Z			2	1		31
7695	50.	4YZ	238	5	9	6	1	36

JACKSON MODEL 648

SET 512

SUPPLEMENTS LATEST ROLL CHART 648-23C

Tube Type	Fil.	D.	E.	Plate Test
2EV5	2.5	A234	AC156	20 YZ
2FY5	2.5	234	A57	18 YZ
3EV5	3.0	A234	AC156	20 YZ
6CD7	6.3	123	A45	21 XZ
			AC58	36 XZ
			6	0 WX
		Visual Test		
6FQ5	6.3	234	A57	21 YZ
13EM7	12.6	238	AC56	23 WY
		A234	A17	26 Z
7695	50.	129	C468	42 VW

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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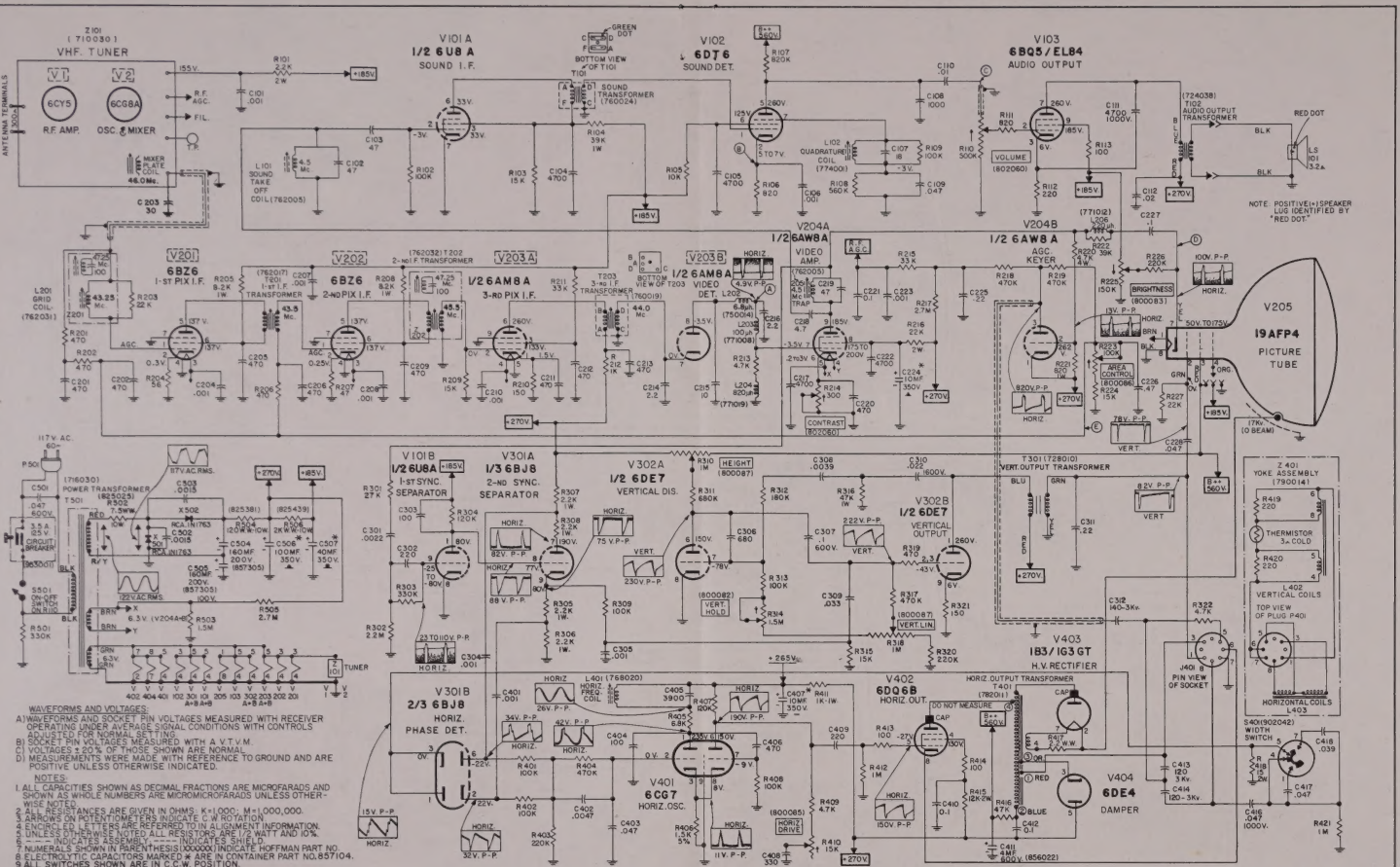
TUBE TESTER DATA • SET 512

JACKSON
MODEL 658

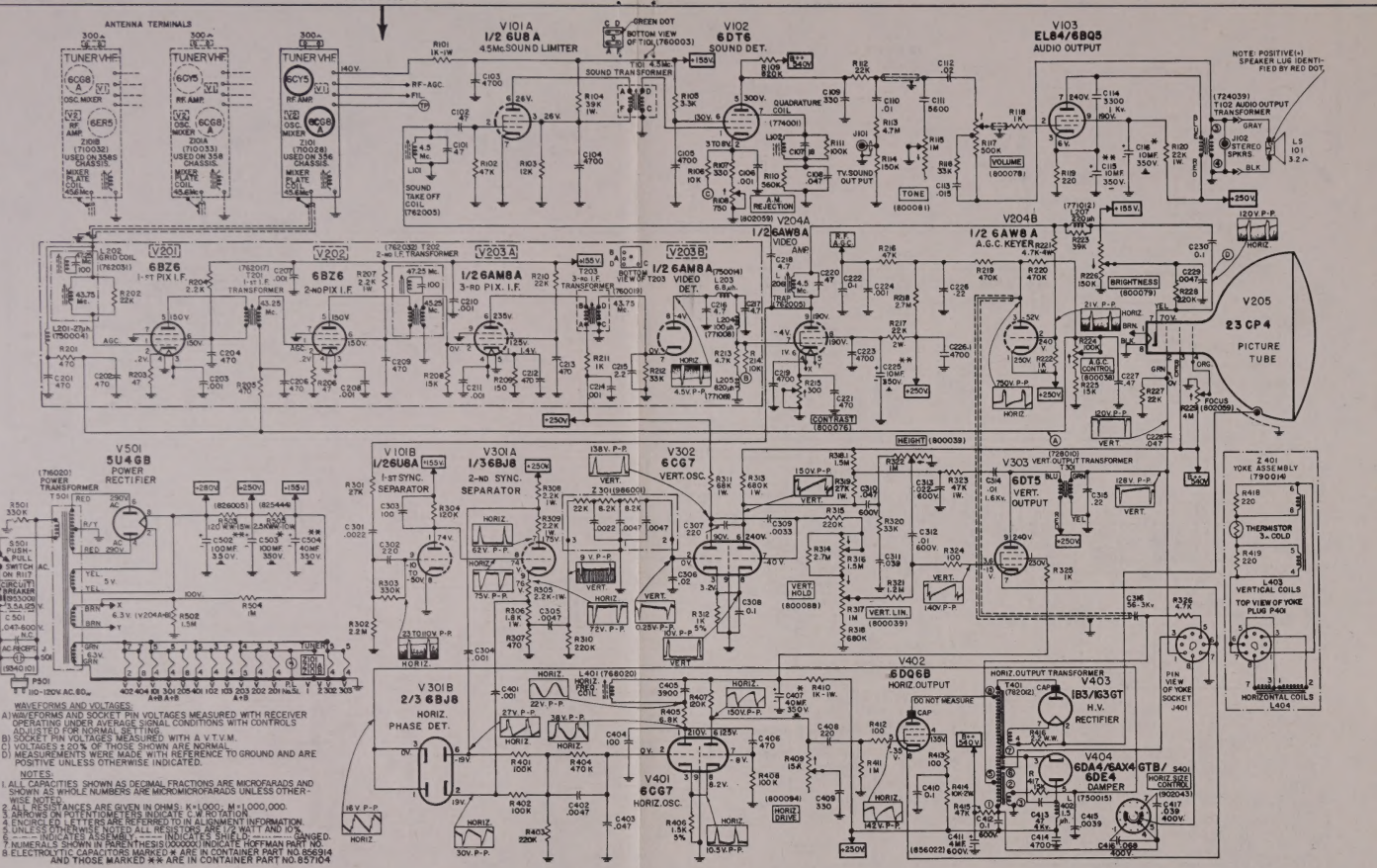
SUPPLEMENTS LATEST ROLL CHART 658-3

Tube Type	Sec.	Heater	Circuit H-K	P-G	Plate	Grid Test	Heater Current
2EV5	T	2.5K	124	ac356	22R	10WY•	A10.6H Z600
2FY5	T	2.5L	124	a57	21R	10WY•	
3EV5	T	3.0H	124	ac356	22R	10WY•	A10.6D Z450
6CD7	T	6.4H	123	ab456	VR1	0V	Shadow Open
		"	"	"	"	25V	Shadow Closed
		"	"	ac568	VR1	0V	Shadow Open
		"	"	"	"	100V	Shadow Closed
6FQ5	T	6.4H	124	a57	23R	15VY•	
13EM7	T	13.6	238	ac56	20Q	15XY•	
	T	"	234	a17	16R	70VY•	
7695	P	50.J	129	c468	19R	90VY•	



HOFFMAN MODELS K1919, T1919, W1919 (CH. 355)

Schematic Diagram Courtesy of Hoffman Electronics Corporation


ANTENNA TERMINALS
TUNER VHF
V101A 1/2 6U8A 4.5Mc SOUND LIMITER
V102 6DT6 SOUND DET.
V103 EL84/6BQ5 AUDIO OUTPUT
V201 6BZ6 1-ST PIX I.F.
V202 6BZ6 2-ND PIX I.F.
V203A 1/2 6AM8A 3-RD PIX. I.F.
V203B 1/2 6AM8A VIDEO DET.
V204A 1/2 6AW8A VIDEO AMP.
V204B 1/2 6AW8A A.G.C. KEYER
V205 23CP4 PICTURE TUBE
V501 5U4GB POWER RECTIFIER
V301A 1/2 6BJ8 2-ND SYNC. SEPARATOR
V301B 2/3 6BJ8 HORIZ. PHASE DET.
V302 6CG7 VERT. OSC.
V303 6DT5 VERT. OUTPUT
V401 6CG7 HORIZ. OSC.
V402 6DQ6B HORIZ. OUTPUT
V403 1B3/1G3GT H.V. RECTIFIER
V404 6DA4/6AX4GTB/6DE4 DAMPER
SOUND TAKE OFF COIL (762005)
SOUND TRANSFORMER
QUADRATURE COIL (774001)
A.M. REJECTION (802059)
VOLUME (800078)
TONE (800081)
BRIGHTNESS (800079)
A.G.C. CONTROL (800058)
CONTRAST (800076)
HEIGHT (800039)
VERT. LIN. (800039)
VERT. HOLD (800088)
HORIZ. DRIVE
FOCUS (802099)
T201 GRID COIL (762031)
T201 1-ST I.F. TRANSFORMER (762017)
T202 2-ND I.F. TRANSFORMER (762032)
T203 3-RD I.F. TRANSFORMER (760019)
T501 POWER TRANSFORMER (760201)
T401 HORIZ. OUTPUT TRANSFORMER (782012)
T303 VERT. OUTPUT TRANSFORMER (728010)
T102 AUDIO OUTPUT TRANSFORMER (724039)
L201 (762033)
L202 (762034)
L203 (771008)
L204 (771009)
L205 (771010)
L401 (768020)
L403 VERTICAL COILS
L404 HORIZONTAL COILS
Z401 YOKE ASSEMBLY (790014)
THERMISTOR 3Ω COLD
TOP VIEW OF YOKE PLUG P401
PIN VIEW OF YOKE SOCKET J401
TOP VIEW OF T203
BOTTOM VIEW OF T102, (760003)
GREEN DOT
NOTE: POSITIVE (+) SPEAKER LUG IDENTIFIED BY RED DOT
PULL SWITCH AC ON R117 CIRCUIT BREAKER (953000)
AC RECEPT. (934010)
TUNER
WAVEFORMS AND VOLTAGES:
A) WAVEFORMS AND SOCKET PIN VOLTAGES MEASURED WITH RECEIVER OPERATING UNDER AVERAGE SIGNAL CONDITIONS WITH CONTROLS ADJUSTED FOR NORMAL SETTING.
B) SOCKET PIN VOLTAGES MEASURED WITH A.V.T.V.M.
C) VOLTAGES ± 20% OF THOSE SHOWN ARE NORMAL.
D) MEASUREMENTS WERE MADE WITH REFERENCE TO GROUND AND ARE POSITIVE UNLESS OTHERWISE INDICATED.
NOTES:
1. ALL CAPACITIES SHOWN AS DECIMAL FRACTIONS ARE MICROFARADS AND SHOWN AS WHOLE NUMBERS ARE MICROMICROFARADS UNLESS OTHERWISE NOTED.
2. ALL RESISTANCES ARE GIVEN IN OHMS. K=1,000; M=1,000,000.
3. ARROWS ON POTENTIOMETERS INDICATE C.W. ROTATION.
4. ENCIRCLED LETTERS ARE REFERRED TO IN ALIGNMENT INFORMATION.
5. UNLESS OTHERWISE NOTED ALL RESISTORS ARE ½ WATT AND 10%.
6. ——— INDICATES ASSEMBLY. ——— INDICATES SHIELD. ——— GANGED.
7. NUMERALS SHOWN IN PARENTHESIS (XXXXXX) INDICATE HOFFMAN PART NO.
8. ELECTROLYTIC CAPACITORS MARKED ★ ARE IN CONTAINER PART NO. 856914 AND THOSE MARKED ★★ ARE IN CONTAINER PART NO. 857104

HOFFMAN MODELS B3803, M3803, SP3803, W3803, B3813, M3813, SP3813, W3813, B3823, M3823, W3823, B3833, M3833, SP3833, W3833, K3843, W3843, M3853, SP3853, W3953 (CH. 356, 358)

Schematic Diagram Courtesy of Hoffman Electronics Corporation

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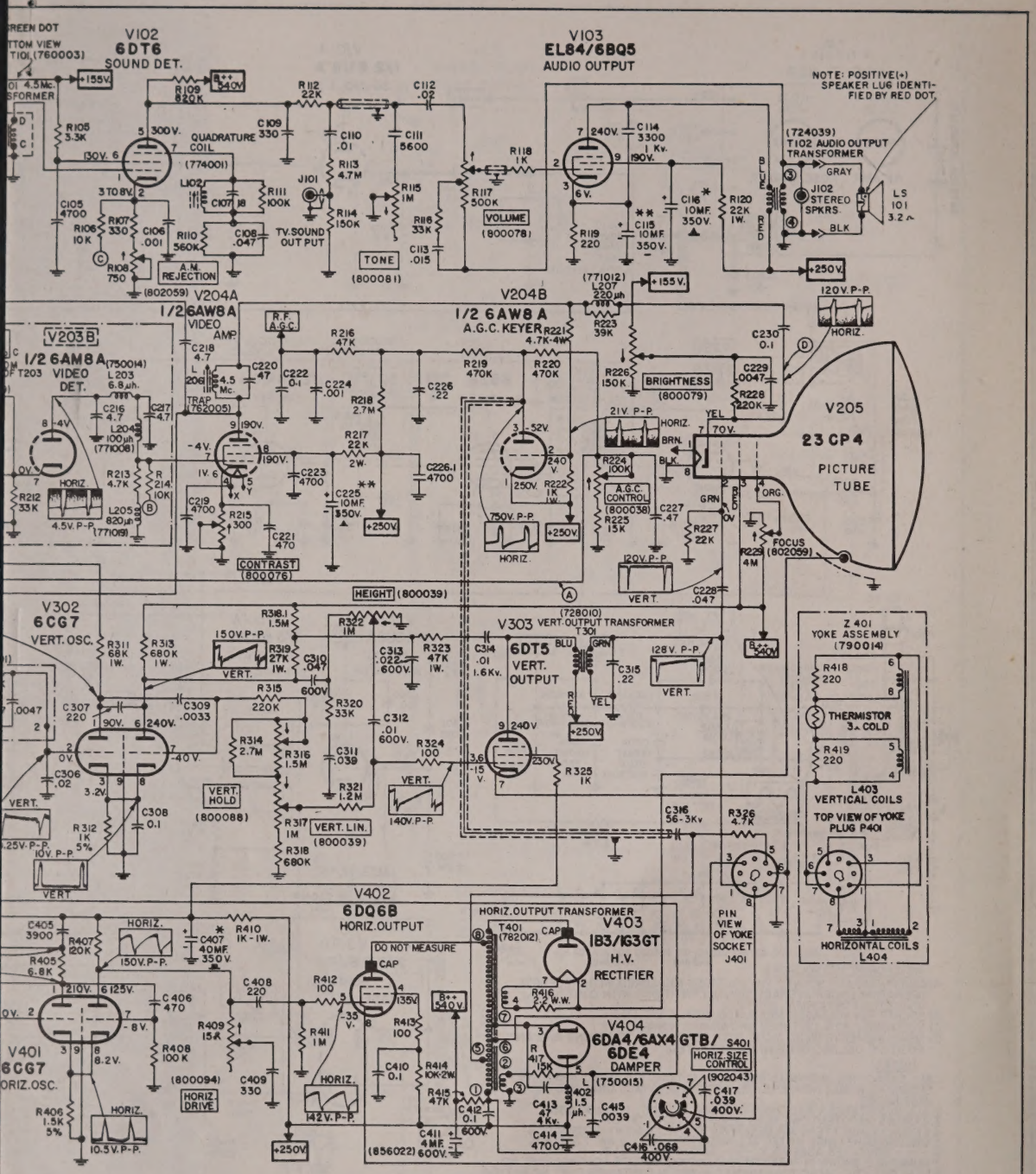

V3813, B3823, M3823,
3853 (CH. 356, 358)

Schematic Diagram Courtesy of Hoffman Electronics Corporation